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fructification, as the arum, dracontium, birthwort, paſſion-flower, &c.

GYPSOPHILA, in botany, a genus of plants whoſe flower contains five oval obtuſe ſpreading petals, with ten ſubulated filaments topped with roundiſh antheræ. The fruit is a globoſe unilocular capſule, opening with five valves, and filled with a number of roundiſh ſmall ſeeds.

GYPSUM, or PLASTER-STONE, in natural hiſtory, a genus of foſſils naturally and eſſentially ſimple, not inflammable nor ſoluble in water, and compoſed of ſmall flat particles; which form bright, gloſſy, and in ſome degree tranſparent maſſes, not flexible or elaſtic, not giving fire with ſteel, nor fermenting with or being ſoluble in acid menſtrua, and very eaſily calcining by fire.

Of theſe gypſums, ſome are harder, others ſofter; and are of ſeveral colours, as white, grey, red, green, &c. ſometimes diſtinct, and ſometimes variouſly blended together.

The texture of all the gypſums being ultimately the ſame, it may be ſufficient to obſerve, that their origin is plainly from particles of a determinate nature and ſubſtance, and of a certain and invariable figure, an oblong, flat, and irregularly angular one. Theſe we ſometimes ſee, as indeed is moſt natural to them, diſpoſed without order or regularity, into looſe, complex, friable maſſes; at' others, they are getting out of their native order, and emulating the ſtructure of other claſſes of bodies, of which they are indeed properly the baſis, and appearing ſomewhat in the figure of the fibrariæ; and at other times, of the foliaceous compoſite flakes of the ſelenitæ: the ſpecies which have theſe ſtructures, are truly varying from the gypſums into thoſe bodies they emulate; for the fibrariæ are only a peculiar arrangement of theſe very particles, and the ſelenitæ only more broad flakes of the ſame, like thoſe of the foliaceous talcs.

The gypſums are much uſed in plaſter, for ſtuccoing rooms, and caſting buſts and ſtatues.

GYPSUM STRIATUM, ſtriated plaſter-ſtone, the whitiſh, leſs gloſſy tricheria, with ſhort thick filaments. See TRICHERIA.

H.

H, The eighth letter of the Engliſh alphabet, and ſixth conſonant.

It is a conſonant of the guttural kind, as the throat concurs more to its formation than any other of the organs of ſpeech.

Menage diſtinguiſhes two kinds of *h*; the one an aſpirate, which is a conſonant; and the other a mute, which has no peculiar ſound diſtinct from that of the immediately following vowel or diphthong.

When the *h* is preceded by a *c*, both together often ſound like the Hebrew ש, with a point over the right horn, as *charity*, &c.

The *ch* in moſt words derived from the Greek, and expreſſed in that language by χ, is generally ſounded like a *k*, as *echo*, *chorus*, &c. though ſometimes ſoftened, as *Cherſoneſus*.

Ph is pronounced like an *f*; as *phraſes*, *Philiſtines*, *phlegm*, &c. moſt of theſe words being of Greek, or Oriental original, proper names, &c. and wrote in Greek with a φ, and with a פ in the Hebrew.

H in ancient authors we meet with inſtead of *f*; particularly in the Spaniſh, where moſt of the words borrowed from the Latin, beginning with an *f*, take

the *h* instead of it, as *hablari* for *fabulari*, *haba* for *faba*, &c.

The sharp accent of the Greeks, which is the same with our *h*, is frequently changed for an *s*, as ἁλς, sal, ἑπτὰ, septem, &c.

Anciently *h* was put for *ch*: thus, of *Chlodovicus* was formed *Hludovicus*, as we find in the coins of the ninth and tenth centuries; in process of time the second of the *h's* being much weakened, the *h* was entirely dropped, and was written *Ludovicus*.

The *h* is sometimes found prefixed to the *c*, as *Hcarolus*, *hcalendæ*, &c. for *Carolus* and *calendæ*.

H also, among the ancients, denotes 200, according to the monkish verse,

H quoque ducentos per se designat habendos.

When a dash was added at top, $\bar{H}$, it signified 200,000.

HABBAKUK, or the prophecy of Habbakuk, a canonical book of the Old Testament.

There is no mention made in scripture, either of the time when this prophet lived, or of the parents from whom he was descended; but according to the authors of the Lives of the Prophets, he was of the tribe of Simeon, and a native of Bethzacar. As he foresaw the taking of Jerusalem by Nebuchadnezzar, he fled to Ostracin in Arabia, where he lived for some time; but after the Chaldæans had made themselves masters of Jerusalem, and were on their return home, he returned into Judæa, where he employed himself in agriculture; but as he was carrying the reapers their dinner, he is said to have been transported by an angel to Babylon, with what he had provided for his people in the field; which he set before Daniel, who was shut up in the lions den, and was transported back again to Judæa, where he died, before the end of the captivity.

He is reported to have been the author of several prophecies which are not extant; but those that are indisputably his, are contained in three chapters. In these the prophet complains very pathetically of the disorders which he observed in the kingdom of Judæa. God reveals to him, that he would shortly punish them in a very terrible manner by the arms of the Chaldæans. He foretels the conquests of Nebuchadnezzar, his metamorphosis, and death. He predicts, that the vast designs of Jehoiakim would be frustrated. He speaks against a prince (probably the king of Tyre) who built with blood and iniquity; and he accuses another king (perhaps the king of Egypt) of having intoxicated his friend, in order to discover his nakedness. The third chapter is a song or prayer to God, whose majesty he describes with the utmost grandeur and sublimity of expression.

HABDALA, a ceremony of the Jews, observed on the sabbath in the evening, when every one of the family is come home. At that time, they light a taper, or lamp, with two wicks at least: the master of the family then takes a cup with some wine, mixed with fragrant spices; and after having repeated a passage or two of scripture, as for example, "I will take the cup of salvation, &c." Psal. cxvi. and, "The Jews had light and gladness, &c." Esth. viii. he blesses the wine and spices. Afterwards he blesses the light of the fire, and then casts his eyes on his hands and nails, as remembering that he is going to work. The whole is intended to signify that the sabbath is over, and is from that moment divided from the day of labour which follows. For this reason the ceremony is called habdala, which signifies distinction.

HABEAS CORPORA, in law, a writ issued for bringing in a jury, or such of them as refuse to appear upon the venire facias, for the trial of a cause brought to issue.

It commands the sheriff to have the jurors before the judges on such a day, &c. and is of the same nature in the common pleas, as the distringas juratories in the court of King's bench.

HABEAS CORPUS, in law, is a writ of two kinds, the one being the great writ of the English liberty, which lies where a person is indicted for any crime or trespass before justices of the peace, or in a court of any franchise, and on being imprisoned, has offered sufficient bail, which has been refused, though the case be bailable; in which case he may have this writ out of the King's bench, in order to remove himself thither, to answer the cause at the bar of that court.

The practice in this case is first to procure a certiorari out of the court of chancery, directed to all the justices, for removing the indictment into the King's bench; and upon that to obtain this writ, directed to the sheriff, for causing the body of the party to be brought at a certain day.

The other kind of habeas corpus is used for bringing the body of a person into court, who is committed to any gaol or prison, either in criminal or civil causes; which writ will remove the person and cause from one court or prison to another.

No habeas corpus, or other writ, to remove a cause from out of an inferior court, can be allowed, if the same be not delivered to the judge of the court, before the jury, who are to try the cause, have appeared, and before any of them are sworn, 43 Eliz. c. 5.

The habeas corpus act (31 Car. II. c. 2.) has ordained, that a person may have a habeas corpus from any judge, on complaint made and view of the warrant of commitment (except such person is committed for treason or felony, expressed in the warrant, or some other offence that is not bailable) which habeas corpus must be made returnable immediately; and on producing a certificate of the cause of commitment, the prisoner is to be discharged, on bail given to appear in the court of King's-bench the next term, or next assizes, &c.

Persons

Perſons committed for either treaſon or felony, expreſsly mentioned in the warrant, upon a motion made in open court, in the firſt week of the term, or day of ſeſſions, &c. after commitment, are to be brought to trial; and if they are not indicted the next term or ſeſſions after commitment, on a motion made the laſt day of that term, they ſhall be let out upon bail, except it appear on oath that the king's witneſſes are not ready; and in caſe they are not indicted, or tried, the ſecond term after commitment, they ſhall be diſcharged.

Judges denying a habeas corpus, ſhall forfeit 500*l.* and if an officer refuſe to obey it, or to deliver a true copy of the commitment-warrant, he forfeits 100*l.* for the firſt offence.

HABEAS CORPUS AD PROSEQUENDUM, a writ for the removal of a perſon in order to proſecution and trial in the proper county.

HABEAS CORPUS AD FACIENDUM ET RECIPIENDUM, a writ iſſued out of the court of Common-pleas, on behalf of defendants ſued in inferior courts, to remove their cauſe into the ſaid court.

HABEAS CORPUS AD RESPONDENDUM, a writ that lies where a perſon is impriſoned at another's ſuit, in any priſon except that of the King's-bench, and a third perſon would ſue the priſoner there; in which caſe, this writ will remove ſuch perſon from the priſon where he is, into the King's-bench, to anſwer the action in that court.

HABEAS CORPUS AD SATISFACIENDUM, a writ that lies againſt a perſon in the Fleet-priſon, &c. to charge him in execution. The delivery of this writ to the warden is ſufficient.

HABENDUM, in law, a term ſignifying to have and to hold.

A deed or conveyance has two principal parts; the premiſes and the habendum. The office of the firſt is, to expreſs the names of the grantor, the grantee, and the things granted: that of the habendum, to ſhew what eſtate or intereſt the grantee is to have in what is granted. According to lord Coke, the habendum is to limit the eſtate, ſo that the general implication, which, by conſtruction of law, paſſes in the premiſes, is by the habendum controlled and qualified. Thus, in a leaſe to two perſons, to have and to hold to the one for life, alters the implication of the joint-tenancy in the freehold, which would paſs by the premiſes, were it not for the habendum.

HABERDASHER, in commerce, a ſeller of hats, or ſmall wares.

HABERE FACIAS POSSESSIONEM, a writ that lies where one has recovered a term for years in an action of ejectment, in order to put him into poſſeſſion again.

HABERE FACIAS SEISINAM, a writ that lies where a perſon has recovered land in the king's court, directed to the ſheriff, commanding him to give ſeiſin of the land recovered.

HABERE FACIAS VISUM, is a writ that lies in divers caſes, as in dower, formedon, &c. where it is neceſſary to take a view of the lands or tenements in queſtion.

HABERGION, a ſmall coat of mail, or only ſleeves and gorget of mail, formed of little iron rings, or maſhes linked into each other. See the article GORGET.

HABILIMENTS *of War*, in our ancient ſtatutes, ſignify armour, harneſs, utenſils, or other proviſions for war, without which there is ſuppoſed no ability to maintain war.

HABIT, in philoſophy, an aptitude or diſpoſition either of mind or body, acquired by a frequent repetition of the ſame act.

HABIT, in medicine, denotes the ſettled conſtitution of the body, or the habitude of any thing elſe, as the ſtructure or compoſition of a body, or the parts thereof.

HABIT is alſo uſed for a dreſs or garb, or the compoſition of garments, wherewith a perſon is covered; in which ſenſe we ſay, the habit of an eccleſiaſtic, of a religious, &c. a military habit, &c.

HABITUDE, among ſchoolmen, the reſpect or relation one thing bears to another. See the article RELATION.

HABITUDE is alſo uſed by philoſophers for what we commonly call habit, or a certain diſpoſition or habitude for the performing or ſuffering certain things, acquired by repeated acts of the ſame kind.

HADDOCK, the Engliſh name of a well known fiſh of the gadus kind, with a bearded mouth, and three fins on the back: its body is whitiſh, the upper jaw longeſt, and the tail a little forked.

HADE, among miners, ſignifies the ſteep deſcent of a ſhaft, or the like paſſage.

HÆMANTHUS, blood-flower, in botany, a genus of plants whoſe flower is monopetalous, erect, and divided into ſix linear ſegments, having a very ſhort angular tube, in which is inſerted ſix ſubulated filaments, topped with oblong incumbent antheræ. The fruit is a roundiſh trilocular berry, containing three triquetrous ſeeds.

The flowers grow in cluſters, and are of a beautiful red colour. This genus includes the dracunculoides of Boerhaave.

HÆMATITES, in natural hiſtory, the blood-ſtone, a kind of mineral, ſo called on account of its reſembling curdled blood, or from its quality of ſtopping blood.

The word is Greek, αιματιτης, and is derived from αιμα, blood.

HÆMATOXYLUM, logwood-tree, in botany. It grows naturally in the bay of Campeachy, Honduras, and other parts of the Spaniſh Weſt-Indies; it riſes to the height of eighteen or twenty feet, and is generally crooked and deformed; the branches are irregular, armed with ſtrong thorns, and furniſhed with winged leaves compoſed of three

or

or four pair of lobes, which are obtuſe and indented. The flowers come in a racemus from the wings of the leaves; they are of a pale yellow colour, each containing five equal and ovated petals, with ten ſubulated ſtamina. The fruit is a lanceolated, obtuſe, and unilocular capſule, opening with two valves, and contains a few, compreſſed, oblong ſeeds.

For the uſes of logwood, ſee the article *Campeachy* Wood.

HÆMOPTOSIS, in medicine, a ſpitting of blood, occaſioned by the rupture or eroſion of ſome veſſel in the lungs, commonly attended with a cough and preſſure on the thorax.

The word is Greek, αιμοπτυσις, and is derived from αιμα, blood, and πτυω, to ſpit.

HÆMORRHAGE, *Hæmorrhagia*, in medicine, an eruption of the blood from any part of the body.

The word is Greek, αιμορραγια, and derived from αιμα, blood, and ρηγνυμι, to burſt.

HÆMORRHOIDAL; the veins and arteries of the rectum and fundament are ſo denominated, as being the ſeat of the hæmorrhoids.

HÆMORRHOIDS, *Hæmorrhoides*, the piles, or a diſcharge of blood from the hæmorrhoidal veins about the anus and rectum.

The word is Greek, αιμορροις, ſignifying the ſame thing, and derived from αιμα, blood, and ρεω, to flow.

Every liberal diſcharge of blood from the veins of the anus, is not to be accounted exceſſive and preternatural; but in order to form an eſtimate of this circumſtance, we are carefully to conſider the veſſels, the habit of body, the ſtrength, the age, and the conſtitution of the patient; for it frequently happens, that the diſcharge of a certain quantity of blood proves ſalutary and beneficial to ſome; whereas the evacuation of an equal quantity proves hurtful and injurious to others: nor is every hæmorrhoidal diſcharge, though larger than uſual, and excited by the increaſed quantity and commotion of the blood, to be eſteemed a diſeaſe; but only ſuch a diſcharge as continues long, impairs the ſtrength, deſtroys the appetite, the due digeſtion of the aliments, nutrition, and the other functions of the body, and conſequently lays a foundation for violent chronical diſorders.

Every evacuation of blood from the inteſtinum rectum is ſupplied from the hæmorrhoidal veſſels; but the external hæmorrhoidal veſſels rarely flow profuſely, but readily degenerate into painful varices, which, when opened, diſcharge blood, though ſeldom in large quantities. But the internal hæmorrhoidal veſſels, which are ramifications of the ſplenic branch, and are diſtributed to the interior ſubſtance of the inteſtinum rectum, and the ſphincter ani, together with the ſmall arteries ariſing from the inferior meſeraic veſſels, not only diſcharge a large quantity, but, when ſuppreſſed, generate thoſe diſeaſes which ariſe from diſorders of the liver, ſpleen, pancreas, meſentery, and inteſtines.

It is uſually agreed, that this ſalutary evacuation from the veins of the anus, is owing to a difficult circulation of the blood through the hæmorrhoidal veins, in conſequence of their perpendicular ſituation, and its difficult return to the vena portæ and the liver; and that the diſcharge actually happens when the extremities of the veſſels, in the inteſtinum rectum, are ſo diſtended by the blood accumulated in them, as at laſt to be ruptured.

The cure.—As this diſorder may proceed from various cauſes, ſo there muſt be various intentions of cure purſued, and different remedies made choice of.

It frequently happens, that when, in plethoric bodies, the hæmorrhoidal diſcharge, uſual at other times, is for ſome time ſtopped, it not only appears again ſuddenly upon any violent commotion either of body or mind, the liberal uſe of ſpirituous liquors, too hot baths, or upon taking medicines increaſing the inteſtine motion of blood, but continues long, and is attended with a large and ſtrong pulſe. When this is the caſe, the firſt ſtep to be taken is to divert the impetus of the blood; for this purpoſe veneſection in the arm, or an immerſion of the arms in a tepid mixture of water and wine, are of ſingular ſervice: then we are to uſe ſuch things as check the exceſſive inteſtine motion of the ſulphureous parts of the blood, eſpecially things of a diluting and refrigerating nature, ſuch as drinking cold water, eſpecially of the chalybeate kind, tincture of roſes prepared with ſpirit of vitriol, a decoction of hartſhorn, mixed with citron or lemon juice. When, together with a loſs of ſtrength, and an injured ſtate of the nobler functions, a large hemorrhoidal diſcharge continues for a long time, and the viſcera begin to be tainted, whilſt, at the ſame time, the blood is rather aqueous and ſerous than fibrous, and of a due conſiſtence; thoſe medicines are highly beneficial which gradually and mildly carry off, by ſtool, the peccant bilious juices, and, at the ſame time, invite the humours from the inteſtinum rectum, to the coats and glands of the other inteſtines. The moſt efficacious of theſe are the preparations of rhubarb, with currants and tamarinds; or, if the body is bilious, with cream of tartar, exhibited in a potion rendered agreeable by an eleoſaccharum, prepared with the oil of citron.

In that more obſtinate and difficultly cured ſpecies of this diſorder, which ariſes from an obſtruction, an infarction, or increaſed bulk, of any of the viſcera; ſuch as the liver, ſpleen, and, in women, the uterus: if there is ſtill any place for the means of relief, ſuch medicines are to be choſen as reſolve the obſtructions without throwing the humours into too violent a commotion.

Among the principal cauſes of a too copious hæmorrhoidal diſcharge, we may juſtly reckon a want

of

of due tone in the inteſtinum rectum, together with its component membranes and veſſels: for this reaſon, ſuch medicines are alſo to be uſed as reſtore the ſtrength of parts too much weakened and relaxed; as the extracts of caſcarilla and red ſaunders.

In order to obtain the deſigned effect, external applications of an aſtringent nature are alſo to be uſed; ſuch as the decoction of balauſtine flowers, red-roſes, myrrh, and the Peruvian bark.

In the cure of violent hæmorrhoidal diſcharges, veneſection is to be premiſed, and the primæ viæ cleanſed, either with recent caſſia, or the beſt rhubarb, exhibited in a decoction: then both internal and external medicines, of a corroborative and gently aſtringent nature, may be ſafely uſed.

When a ſudden ſtoppage of the hæmorrhoidal diſcharge is ſucceeded by an uneaſineſs of the præcordia, inflations, reſtleſſneſs, and difficulty of breathing, it is to be recalled by mild laxatives, emollient clyſters, and ſuppoſitories.

In no diſeaſe is an accurate and cautious regimen more neceſſary than in this, ſince, in conſequence of a neglect in this particular, the moſt efficacious remedies will not produce their deſired effect.

When the diſorder is once removed, due pains are to be taken in order to prevent its return. This intention is moſt commodiouſly and effectually anſwered by veneſection three or four times inſtituted every year; by cleanſing the primæ viæ once a month, and by the prudent uſe of mineral waters, or only of chalybeated milk; and, laſtly, all ſuch aliments and laxatives as excite pain, are carefully to be abſtained from.

HAGAI, a canonical book of the Old Teſtament, ſo called from the prophet of that name, who, in all probability, was born at Babylon, from whence he returned with Zerubbabel.

This prophet, by the command of God, exhorted the Jews, after their return from their captivity, to finiſh the rebuilding of the temple, which they had intermitted for fourteen years. His remonſtrances had the deſired effect; and to encourage them to proceed in the work, he aſſured them from God, that the glory of this latter houſe ſhould be greater than the glory of the former: which was accordingly fulfilled, when Chriſt honoured it with his preſence: for, with reſpect to the building, this latter temple was nothing in compariſon of the former.

HAGGARD FALCON, the greeniſh legged falcon, with a livid back. It is a large ſpecies, equal to a full grown hen in ſize. See the article FALCON.

HAGIOGRAPHA, or holy writings, a name given to a particular diviſion of the Old Teſtament, as containing hymns to God, and moral precepts for the conduct of life. The books diſtinguiſhed by this term were the Pſalms, Proverbs, Eccleſiaſtes, and the Song of Solomon.

HAIL, *Grando*, in phyſiology, a watery concretion in the form of pellucid white globules, that fall from the air.

It is thought to be drops of rain frozen in their paſſage through the middle region: or according to the Carteſians, the fragments of a frozen cloud, half melted, precipitated and congealed again.

Hail is of various figures, according to the degrees of heat or cold of the air through which the liquified clouds paſs. It frequently attends thunder and lightning; the nitre that contributes to the one, having alſo a large ſhare in the production of the other.

HAIR, *Crinis* or *Capellus*, a ſort of tegument for the greateſt part of animals. It is found on all parts of the human body, except the ſoles of the feet and palms of the hands.

Hair properly lives and receives nutriment to diſtend it like the other parts of the body; however, this growth is is of a different kind from that of the reſt of the body, and is not immediately derived therefrom, nor reciprocated therewith. It grows like plants out of the earth, or as ſome plants ſhoot from the parts of others; from which, though they draw the nutriment, each has its diſtinct life and œconomy.

Hairs are obſerved by the microſcope to be hollow, and furniſhed with a multitude of veſſels; and, however they appear ſmooth to the naked eye, the microſcope ſhews them knotted like ſome ſorts of graſs, and to ſend out branches from their joints.

The branching of the hair is pretty viſible at the extremities by the help of a microſcope; for it is very apt to ſplit, eſpecially if worn too long, or kept too dry; and by the ſame means it appears like a bruſh.

Each hair has a little bulbous or oval root in the ſkin, which is ſometimes plucked away with it. The hair is commonly reputed an excrement, and whatever the nature of its nouriſhment be, it ſeems to be more ſimple than the other humours of the body. For long after death, when all the other parts and humours are corrupted, the hair will vegetate.

The ſize of hair depends on the magnitude of the pores they iſſue from; if thoſe be ſmall, theſe are fine; if thoſe be oblong or ſinous, the hair is curled. Their length depends on the quantity of the proper humour to feed them; and their colour on the quality of that humour; whence at different periods of life the colour uſually differs.

HAIR'S-BREADTH, a meaſure of length, being the forty-eighth part of an inch.

HAKE, in ichthyology, the Engliſh name of the gadus, with two fins on the back, and the under jaw longeſt. It grows to two feet or more in length, but is the ſlendereſt of all the gadi.

HALBARD, or HALBERT, in the art of war,

a well known weapon, carried by the ſerjeants of foot and dragoons.

HALBERT, among farriers, is a ſmall piece of iron an inch broad, and three or four inches long, ſoldered to the toe of a horſe's ſhoe, to hinder a lame horſe from treading on his toe.

Theſe halbert-ſhoes neceſſarily conſtrain a lame horſe, when he goes at a moderate pace, to tread or reſt on his heel, which lengthens and draws out the back ſinew, that was before in ſome meaſure ſhrunk.

HALCYON, in ornithology, a name given by the ancients to the iſpida, or king-fiſher. See the article KING-FISHER.

HALCYON-DAYS, *Dies halcyonii*, in antiquity, a name given to ſeven days before and as many after the winter ſolſtice; by reaſon the halcyon, invited by the calmneſs of the weather, laid its eggs in neſts built on the rocks, cloſe by the brink of the ſea, at this ſeaſon.

HALESIA, in botany, a genus of plants, whoſe flower conſiſts of a monopetalous ventricoſe bell-ſhaped corolla, with ten ſubulated erect filaments, topped with oblong obtuſe antheræ. The fruit is a corticated oblong bilocular nut, containing two ſeeds.

HALLERIA, in botany, a genus of didynamious plants, whoſe flower is monopetalous and ringent. The fruit is a roundiſh berry, with two cells, each containing one hard ſeed.

HALF-BLOOD, in law, is where a man marries a ſecond wife, the firſt being dead, and by the firſt venter has a ſon, and by his ſecond venter has likewiſe a ſon, the two brothers in this caſe are but of half blood; they being iſſue by different venters; and on that account, lands in fee cannot deſcend from one to the other; except in caſe of crown-lands, dignities, or eſtates tail. But half-blood is no impediment to an adminiſtration, which may be granted to that as well as to the whole blood, of the effects of an inteſtate; and the half-blood ſhall come in for a ſhare of his perſonal eſtate, equally with the whole blood, as the brothers by different venters are next of kin in equal degree. 22 Car. II. c. 10.

HALF-MOON, *Demi-Lune*, in fortification, a work which is commonly made before the curtain or flanked angle of the baſtion: the former generally conſiſts of two little flanks and two faces, which terminate in a ſaliant angle towards the fields; the gorge of the demi-lune is terminated by two lines continued from the counterſcarpe of the foſſé, that form an entering angle towards the place, about the middle of the curtain. The demi-lune on the flanked angle of the baſtion differs only from the former, in that it is formed by a circular line; and hence it takes its name demi-lune.

The moderns make uſe of good counterguards to cover the baſtions inſtead of the demi-lunes.

They call a demi-lune what was formerly denominated a ravelin, only that this laſt work has no flanks, and has two faces terminating in a ſaliant angle towards the field.

A demi-lune is ſaid to be crowned when it is covered by a crowned work: it is in like manner ſaid to be a tenaille, when on the right and left it has two works conſtructed in a right angle on the flanked angle of the demi-lune, by the prolongation of its two faces, between twenty-eight and thirty fathoms; each of theſe works having two faces terminating in a ſaliant angle towards the field, and a ditch of nine fathoms that ſeparates them from the demi-lune and counterſcarpe.

Laſtly, a demi-lune is called a horn-work, when it is counter-guarded by two works that advance in form of a horn towards the country, having before it a little demi-lune, or lunette, that covers the intermediate ſpace betwixt them, and conſequently the flanked angle of the demi-lune.

HALF-SEAL, that uſed in the court of chancery for ſealing commiſſions to delegates, upon any appeal, in eccleſiaſtical or marine cauſes.

HALF-TANGENTS. See the articles TANGENT and SCALE.

HALIARDS, in the marine language, the ropes or tackles by which the ſails are hoiſted up along the maſts or ſtays of the ſhip.

HALL, in architecture, a large room at the entrance of a fine houſe and palace. Vitruvius mentions three kinds of halls; the Tetraſtyle, with four columns, ſupporting the platform or ceiling; the Corinthian, with columns all round let into the wall, and vaulted over; and the Egyptian, which had a periſtyle of inſolated Corinthian columns, bearing a ſecond order with a ceiling.

HALL, in old writers, is alſo uſed for a manſion-houſe; and to this day, in many parts of the kingdom, gentlemen's ſeats are called halls.

HALLAGE, a fee or toll paid for cloth brought to be ſold in Blackwell-hall, London.

HALLELUJA, a word ſignifying, praiſe the Lord.

The ſinging halleluja was a ſort of invitatory, or call to each other, to praiſe the Lord.

HALO, in phyſiology, a meteor, in form of a luminous ring, or circle, of various colours, appearing round the bodies of the ſun, moon, or ſtars.

The word is formed of the Greek αλως, or αλων, area.

That around the moon is the moſt uſual, and is called *corona*, crown.

Naturaliſts conceive the halo to ariſe from a refraction of the rays of light in their paſſing through the fine rare veſiculæ of a thin nubicula, or vapour, towards the top of our atmoſphere; which account they confirm hence, that a quantity of water being thrown up againſt the ſun, as it breaks and diſperſes

perſes into drops, it forms a kind of halo, or iris, exhibiting the colours of the natural rainbow.

M. Huygens ſuppoſes halos, or circles round the ſun, to be formed by ſmall round grains of a kind of hail, made up of two different parts, one of which is opake, and incloſed in the other, which is tranſparent; which is the general ſtructure obſerved in hail.

After the ſame manner he accounts for the parhelia; only that he imagines the icy grains of an oblong figure, and rounding at the ends, like cylinders with round convex tops. Where ſome of theſe cylinders are in an erect poſition, the circle they form will be white, by reaſon of the reflection of the rays of the ſun on the ſurface of theſe cylinders. He proceeds to account for the coloured halos and parhelia, from the ſame hypotheſis; and produces an experiment of a glaſs cylinder, a foot long, having within it an opake kernel (which was a cylinder of wood), and the ambient ſpace filled with water; this cylinder, being expoſed to the ſun, and the eye diſpoſed in a proper place, the ſeveral ſucceſſive reflexions and refractions neceſſary to produce ſuch an effect did plainly appear.

The light which comes through drops of rain by two refractions, without any reflection, Sir Iſaac Newton obſerves, ought to appear ſtrongeſt, at the diſtance of about twenty-ſix degrees from the ſun, and to decay gradually both ways, as the diſtance from him increaſes and decreaſes: and the ſame is to be underſtood of light, tranſmitted through ſpherical hail-ſtones.—Add, that if the hail be a little flatted, as is often the caſe, the light tranſmitted may grow ſo ſtrong at a little leſs diſtance than that of twenty-ſix degrees, as to form a halo about the ſun or moon; which halo, as often as the hail-ſtones are duly figured, may be coloured; and then it muſt be made red within by the leaſt refrangible rays, and blue without by the moſt refrangible ones; eſpecially if the hail-ſtones have opake globules of ſnow in their center, to intercept the light within the halo, as Huygens has obſerved, and make the inſide thereof more diſtinctly defined than it would otherwiſe be.

Such hail-ſtones, though ſperical, by terminating the light by the ſnow, may make a halo red within, and colourleſs without, and darker in the red than without, as haloes uſed to be: for of thoſe rays, which paſs cloſe by the ſnow, the rubiform will be leaſt refracted, and ſo will come to the eye in the directeſt lines.

HALTER-CAST, among farriers, an excoriation of the paſtern, occaſioned by a horſe's endeavouring to ſcrub the itching part of his body near the head and neck, when one of his hinder feet entangling in the halter, he ſometimes receives very dangerous hurts in the hollow of his paſtern, by his ſtruggling to diſengage himſelf.

For the cure of this, take linſeed oil and brandy of each an equal quantity; ſhake them together in a bottle till they are well mixed, and anoint the place morning and evening, having firſt cut away the hair; but care muſt be taken to keep the foot very clean.

HALTING, among farriers, a limping or going lame, an irregularity in the motion of a horſe, ariſing from a lameneſs in the ſhoulder, leg, or foot, which makes him ſpare the part, or uſe it timorouſly.

HALYMOTE, in old law books, ſignifies a holy or eccleſiaſtical court. See the article COURT.

HAM, in anatomy, the part behind the knee. See KNEE and LEG.

HAM, in old law writers, a Saxon word uſed for a home or dwelling place, for a borough and a village, and alſo for a little narrow ſlip of meadow.

HAM, in cookery the leg and thigh of a hog ſeaſoned and dried.

HAMADRYADS, *Hamadryades*, fabulous deities revered among the ancient heathens, who were ſuppoſed to preſide over woods and foreſts, and to be incloſed under the bark of oaks, &c. and to live and die with the trees they belong to.

The word is Greek, αμαδρυαδες, and compounded of αμα, together, and δρυς, an oak.

HAMBLING, or HAMELLING, in the foreſt law, is the hamſtringing of dogs, or cutting the great tendon called the hamſtring.

HAMLE, the name of the eleventh month of the Ethiopian year, beginning on the twenty-fifth of June, old ſtyle.

HAMLET, HAMEL, or HAMPSEL, is a ſmall village, or part of a pariſh.

HAMMER, a well known tool uſed by mechanics, conſiſting of an iron head, fixed croſſwiſe upon a handle of wood.

HAMMOCK, among ſailors, a piece of canvas about ſix feet long, and three feet wide, drawn together at the two ends, and hung horizontally under the deck for the ſailors to ſleep in. In time of battle, they are ſtrongly faſtened and laid above the rails on the quarter-deck and fore-caſtle, to barricade and prevent the execution of ſmall ſhot.

HAMSOKEN, in old law books, ſignifies the liberty or privilege a man enjoys in his own houſe. It is alſo ſaid to ſignify a franchiſe granted to lords of manors, by which they hold pleas, and take cognizance of the breach of that immunity.

HANAPER, or HANPER, in chancery. See HANPER.

HAND, *Manus*, in anatomy; the laſt part of the upper extremity is divided into the carpus, metacarpus, and fingers, or into the inſide, hollow, or palm, and into the outſide or back of the hand.

The carpus or wriſt conſiſts of eight ſmall, unequal, and irregular bones; and, taken all together, repreſent

repreſent a ſort of grotto of an irregular quadrangular figure, and connected principally with the baſis of the radius.

The metacarpus conſiſts of four bones, one ſide of which forms the palm of the hand, the other the back of the hand. Theſe bones are long, thicker at the extremities than at the middle, and of an unequal length and bigneſs. The firſt is the largeſt, the reſt are leſſened by degrees in all their dimenſions. The fingers make the third part of the hand, and terminate the whole upper extremity; they are five in number in each hand, called the thumb, the fore-finger, the middle-finger, the ring-finger, and the little-finger. The thumb is the biggeſt of all the fingers; next to that, the third, called the long-finger; the ſecond and fourth are ſhorter than the third; the fourth being a very little longer than the ſecond; the fifth is the ſmalleſt of all.

Each thumb and finger conſiſt of three pieces, called phalanges; the firſt of which is longer and thicker than the ſecond; and the ſecond than the third.

The carpus is the baſis and center of all the motions of the hand, except that of rotation: by means thereof we can bend the hand in all directions, but with more eaſe towards the ſides and edges, than any other way.

The radius is in a manner the handle of the hand; and it is chiefly by means thereof that we can move the hand reciprocally as on the axis, turning either edge of it towards the body. This motion is termed pronation, and when the cubital or ſmall edge is towards the body, it is termed ſupination. In the natural and moſt ordinary ſituation of the hand, the palm is turned towards the body, and not the edges.

The ulna ſupports the handle of the hand, without being itſelf articulated with the hand.

All the bones of the carpus, metacarpus, and fingers, are cruſted over with cartilages.

HAND, in the manege, a meaſure of four inches, or of a clinched fiſt, by which the height of a horſe is computed. Thus a horſe of war ſhould be ſixteen hands high.

HAND is alſo uſed for the diviſion of a horſe into the fore and hind parts. The parts of the fore-hand are the head, neck, and fore-quarters; and thoſe of the hind-hand include all the other parts of his body.

HAND is likewiſe uſed for the horſeman's hand. Thus, ſpear-hand, or ſword-hand, is the horſeman's right hand, and bridle-hand is his left hand.

HAND-BREADTH, a meaſure of three inches.

HAND-HOOK, an inſtrument uſed by ſmiths to twiſt ſquare iron.

HAND-SCREW, an inſtrument more uſually called a jack. See the article JACK.

Harmonical HAND, in muſic, a name given to the ancient diagram. See DIAGRAM.

Impoſition of HANDS, the ceremony of laying the hands on the head of a perſon to be ordained. See ORDINATION.

HANDS, in heraldry, are borne in coat armour dexter and ſiniſter, that is, right and left, expanded or open. Theſe are the moſt neceſſary parts of the human body, as they ſerve to expreſs all ſorts of actions, and even our very thoughts and deſigns; thus joining of hands is an univerſal token of friendſhip, and clapping of hands a general mark of applauſe.

HANDING *the Sails*, in the ſea-language, the ſame as FURLING, which ſee.

HANDSPIKE, a ſort of bar uſed to heave the windlaſs round at the time of weighing the anchor. It is alſo uſed as a lever on many occaſions. See the article WINDLASS.

HANKS, in the marine, certain wooden rings fixed upon the ſtays of a ſhip, to which the ſtay-ſails are faſtened in different places, as a curtain is faſtened to the rings which run upon its rod: by theſe the ſails are eaſily extended upon the ſtays to their utmoſt ſtretch.

HANPER, HANAPER, or HAMPER, an office of the chancery, anſwering to the fiſcus of the Romans.

HANSE, or HANS, a company of merchants united for the promotion and advantage of trade.

HANSE-TOWNS, port-towns of Germany, of which Lubec and Hamburg were the chief. They were formerly all of them imperial cities, confederated for their mutual defence, and the protection of their trade.

HAPPINESS, among philoſophers, conſiſts in the enjoyment not only of the goods of the body, as health, ſtrength, neatneſs, decency, &c. but alſo of the more refined goods of the mind, as knowledge, memory, taſte, and eſpecially moral virtues, magnanimity, fortitude, benevolence, &c.

HAQUEBUT, HAGBUT, HARQUEBUSS, or ARQUEBUSE, a kind of fire-arm.

The word is French, *arquebuſe*, and derived from the Italian *arco*, a bow, and *buſio*, a hole; on account of the touch-hole at which the priming is put, and as it ſucceeded to the ancient bow.

HARANGUE, a ſpeech made by an orator in public.

It is frequently uſed for a pompous and prolix declamation.

HARBINGER, an officer of the king's houſhold, having four yeomen under him, who ride a day's journey before the court, when it travels, to provide lodgings, &c.

HARBOUR, a place where ſhips may ride ſafe at anchor, chiefly uſed in ſpeaking of thoſe ſecured by a boom and chain, and furniſhed with a mole. See BOOM, CHAIN, and MOLE.

HARDENING, the act of communicating a greater degree of hardneſs to a body than it had before.

Steel and iron are hardened and tempered divers ways, as by the hammer; quenching it, when hot, in cold water; caſe-hardening, &c.

Caſe-HARDENING is a leſſer degree of ſteel-making, and performed by baking razors, files, knife-blades, &c. in a kind of oven, and laying over them a ſtrata of powdered charcoal, hoofs, horns, &c. ſo as to exclude the air; and thus by baking to give a coat of ſteel to theſe inſtruments ſome depth below their ſurface.

Others cover the iron or ſteel all over with a compoſition of an equal quantity of powdered horn, bay-ſalt, and ſtale urine, or white wine vinegar, well mixed together, and then wrap it up in loam or plate iron, and bring the whole to the fire to a blood-red heat, and no higher; and, laſtly, take it out and quench it.

HARDNESS, in philoſophy, that quality in bodies, whereby their parts mutually cohere together, ſo as not to give way to an external impulſe, nor yield inwards, without breaking. Hardneſs in this ſenſe is in contradiſtinction to ſoftneſs. See the article ATTRACTION *of Cohesion*.

HARDS, or HURDS, the coarſer part of hemp or flax, ſeparated from the fine. See the articles HEMP and FLAX.

HARDY SHRUBS, among gardeners, are thoſe which endure the auſterity of the winter.

The two hardieſt ſhrubs we are poſſeſſed of, are the ivy and box; theſe ſtand the ſeverity of our ſharpeſt winter unhurt, while other ſhrubs periſh, and trees have their ſolid bodies ſplit and torn to pieces. In the hard winter of the year 1683, theſe two ſhrubs ſuffered no injury any where; though the yews and hollies, which are generally ſuppoſed very hardy, were this winter in ſome places killed, and in others ſtripped of their leaves, and damaged in their bark. Furze buſhes were found to be ſomewhat harder than theſe, but they ſometimes periſhed, at leaſt down to the root. The broom ſeemed to occupy the next ſtep of hardineſs beyond theſe; this lived where the others died; and where even this died, the juniper ſhrubs were ſometimes found unhurt. This laſt is the only ſhrub that approaches to the hardineſs of the box and ivy, but even this does not quite come up to them; for while they ſuffer nothing in whatever manner they are expoſed, the juniper, though it bears cold well under the ſhelter of other trees, yet cannot bear the viciſſitudes of heat and cold, inſomuch that ſome juniper ſhrubs were found half dead, and half vigorous; that ſide which faced the mid-day ſun, having periſhed by the ſucceſſive thawings and freezings of its ſap; while that which was not expoſed to the viciſſitudes of heat, had bore the cold perfectly well. Such ſhrubs as are not hardy enough to defy the winter, but appear half dead in the ſpring, may often be recovered by Mr. Evelyn's method of beating their branches with a ſlender hazel wand, to ſtrike off the withered leaves and buds, and giving a free paſſage to the air to the internal parts. Where this fails, the method is to cut them down to the quick; and if no part of the trunk appears in a growing condition, they muſt be taken off down to the level of the ground. *Phil. Tranſ.* N°. 165.

HARE, in zoology, an animal of the lepus kind, diſtinguiſhed by its abrupt tail and black eyes. It greatly reſembles the rabbit, but is larger, and ſomewhat longer, in proportion to its thickneſs; and its ears are remarkably long, being always in a poſition to receive the leaſt ſound, and moveable with ſurpriſing eaſe.

HARE-LIP, *Lebium Laporinum*, in ſurgery. See the article LIP.

HARIOT, or HERIOT, in law, a due belonging to a lord at the death of his tenant, conſiſting of the beſt beaſt, either horſe, ox, or cow, which he had at the time of his death; and in ſome manors, the beſt goods, piece of plate, &c. are called hariots.

HARLEQUIN, a buffoon or merry-andrew; but is now uſed for a perſon of extraordinary agility, dreſſed in party-coloured cloaths, the principal character in a pantomime entertainment. See the article PANTOMIME.

HARMONIA, in anatomy, a ſpecies of articulation, being a kind of ſymphyſis intended for abſolute reſt. See the article ARTICULATION.

HARMONICA, or, as it is often improperly called, ARMONICA, among muſicians, is an inſtrument compoſed of muſical glaſſes.

HARMONICAL ARITHMETIC, that part of arithmetic which conſiders muſical intervals, expreſſed by numbers, in order to our finding their mutual relations, compoſitions, and reſolutions.

HARMONICAL COMPOSITIONS, in a general ſenſe includes both harmony and melody, that is, of muſic or ſongs, both in a ſingle part, and in ſeveral parts.

HARMONICAL INTERVAL, in muſic, denotes the difference of two ſounds, which is agreeable to the ear, whether in conſonance or ſucceſſion; and are, therefore, the ſame with concord. See the articles CONCORD and INTERVAL.

HARMONICAL PROPORTION. See the article PROPORTION.

HARMONICAL SERIES, a ſeries of many numbers in continual harmonical proportion. Thus if there are four or more numbers, of which every three immediate terms are harmonical, the whole will make an harmonical ſeries: ſuch is 30 : 20 : 15 : 12 : 10. Or, if every four terms immediately next each other are harmonical, it is alſo a continual harmonical ſeries, but of another ſpecies, as 3, 4, 6, 9, 18, 36, &c.

HARMONICAL SOUNDS, an appellation given, by Mr. Sauveur, to ſuch ſounds as always make a

determinate number of vibrations, in the time that one of the fundamentals, to which they referred, makes one vibration.

HARMONICS, *Harmonica*, a diviſion of the ancient muſic. It conſiders the differences and proportions of ſounds with reſpect to gravity and acuteneſs, in contradiſtinction to rhythmica or metrica.

HARMONY, in muſic, the agreeable reſult of an union of ſeveral muſical ſounds, heard at the ſame time.

The word is Greek, *αρμονια*, and *αρω*, to fit or adapt.

As a continued ſucceſſion of muſical ſounds produces melody, ſo a continued combination of them produces harmony.

HARMONY is ſometimes applied to a ſingle voice, when ſonorous and ſoft; or to a ſingle inſtrument, when yielding a very agreeable ſound.

HARMONY alſo denotes a certain agreement between the ſeveral parts of a diſcourſe, which renders the reading thereof agreeable.

HARMONY, in architecture, an agreeable relation between the parts of a building.

HARMONY, in painting, both in the compoſition and colours of a picture: the former denotes the connexion between the figures, with reſpect to the ſubject of a piece: in the colouring it denotes the agreeable mixture of different colours. M. de la Chambre derives the harmony of colours from the ſame proportions as that of ſounds. On this principle he lays down green as the moſt agreeable colour, correſponding to the octave; red to a fifth; yellow to a fourth, &c.

HARMONY *of the Spheres*, a ſort of muſic much talked of by many of the philoſophers and fathers, ſuppoſed to be produced by the ſweetly tuned motions of the ſtars and planets.

Pre-eſtabliſhed HARMONY, a celebrated ſyſtem of M. Leibnitz, whereby he accounts for the communication between the ſoul and body.

Philoſophers univerſally held, that the ſoul and body act phyſically on each other. Des Cartes firſt ſhewed that the heterogeneity of their nature did not admit of ſuch real union, and that they could only have an apparent one, of which God is the mediator. M. Leibnitz, unſatisfied with either of theſe hypotheſes, eſtabliſhed a third. A ſoul is ſaid to have a certain ſeries of thoughts and deſires; a body, which is only a machine, is to have a certain ſeries of motions, that are determined by the combination of its mechanical diſpoſition with the impreſſions of external objects.

If now a ſoul and body are ſo framed that the whole ſeries of deſires and motions of each exactly correſpond, this ſoul and body will have a relation to one another, not by any actual union, but by the conſtant and perpetual correſpondence between the actions of both. Now God puts together this ſoul and body, which had ſuch an antecedent correſpondence, ſuch a pre-eſtabliſhed harmony. And ſo of other ſouls and bodies that have been or ever will be joined.

The ſame principle he extends to the kingdoms of nature and grace, to account for the apparent communication betwixt them, and to make phyſical and moral evil correſpond. See *Leibn. Eſſais de Theodicée.*

HARNESS, the furniture put upon a horſe to draw in a coach, or other wheel carriage.

HARNESS-GALLS, ſwellings or ſoreneſs on the breaſts of coach horſes, occaſioned by the galling of the harneſs, eſpecially in rainy weather.

To cure this, firſt ſhave off the hair about the ſore very cloſe, and rub the whole breaſt with a lather of water and black ſope; then waſh that part of the breaſt which is uſually covered with the petrel, with ſalt-water, ſuffering it to dry of itſelf. If the hardneſs of any part of the harneſs occaſions the galling, take it away, or cover it with little bolſters.

HARP, a muſical inſtrument of the ſtring-kind, of a triangular figure, and held upright between the legs, to be played upon with the fingers or nails.

The word is variouſly derived; ſome derive it from the High-Dutch *harpff*; others from the Saxon *herrpa*; both ſignify the ſame thing.

Bell HARP, a muſical inſtrument of the ſtring-kind; thus called from the common players of it ſwinging it about as a bell on its biaſs.

It is about three feet long; its ſtrings, which are of no determinate number, are of braſs or ſteel wire, fixed at one end, and ſtretched acroſs the ſound-board, by ſcrews fixed at the other end. It takes in four octaves, according to the number of ſtrings, which are ſtruck only with the thumbs, the right hand playing the treble, and the left the baſe; and in order to draw the ſound the clearer, the thumbs are armed wtth a little wire-pin. This may perhaps be the lyra or cythara of the ancients; but we find no mention of it under the name it now bears, which muſt be allowed to be modern.

HARPIES, *Harpyæ*, *αρπυιαι*, in antiquity, rapacious impure ſorts of monſters, of the bird-kind, deſcribed by Virg. Æn. III. The ancients looked on the harpies as a ſort of genii.

There were three harpies, Aello, Ocypete, and Celœno; which laſt Homer calls Pedarge.

HARPINEER, or HARPONEER, the perſon who manages the harping-iron.

HARPINGS. See the article SHIP-BUILDING.

HARPING-IRON, or HARPOON, a large ſpear or javelin, made of forged iron, and five or ſix feet long; it is faſtened to a line, and uſed in the whale fiſhery.

HARP-

HARPSICHORD, the moſt harmonious of all the muſical inſtruments of the ſtring-kind. It is played on after the manner of the organ, and is furniſhed with a ſet and ſometimes with two ſets of keys; the touching or ſtriking of theſe keys move a kind of little jacks, which alſo move a double row of chords or ſtrings, of braſs or iron, ſtretched over four bridges on the table of the inſtrument.

HARRIER, a kind of hound, endowed with an admirable gift of ſmelling, and very bold in the purſuit of his game.

There are ſeveral kinds of harriers; ſome being for the hare, the fox, the wolf, hart, weaſel, badger, &c.

HARROW, in agriculture, an inſtrument uſed by huſbandmen to break the clods of earth, and to draw the ground over the ſeed when ſown. It is a ſort of wooden drag, made in form of a ſquare, with large iron teeth, or tines, not unlike thoſe of a horſe. See HORSE.

HART, a ſtag, or male deer, in the ſixth year. See STAG and CERVUS.

HART, among ſailors, a ſort of dead-eye with only one hole in it, uſed to draw tight the ſtays. See DEAD-EYE and STAY.

HART-ROYAL, one that has been hunted by the king or queen, and eſcaped with life; in which caſe, proclamation is uſually made, that none kill or offend him, as being a hart-royal proclaimed.

HART'S HORNS, *Cornua Cervi*, in pharmacy, the whole horns of the common male deer, as ſeparated from the head, without farther preparation.

The chemical analyſis of hart's horn is ſufficiently known: it yields a water highly impregnated with a volatile ſalt, which is called ſpirit of hart's horn, with a fetid oil, and a volatile ſalt by the common diſtillation in a retort. The remainder in the bottom of the retort, after the diſtillation is finiſhed, is black; but on being calcined in an open fire, it becomes white and friable, and is what is kept in the ſhops under the name of burnt hart's horn. Beſide theſe preparations, we uſe the thin ſhavings of the horn, which, on long boiling in water, become a jelly: this jelly is nutritive and ſtrengthening; it is ſometimes given in diarrhœas; but a decoction of burnt hart's horn in water is more frequently uſed for this purpoſe, and is what is called hart's horn drink.

The ſalt of hart's horn is a great ſudorific, and is given in fevers of many kinds with great ſucceſs; the ſpirit has the ſame and all the other virtues of volatile alkalis, and is uſed to bring people out of faintings by its pungency, on holding it under their noſe, and at the ſame time pouring ſome drops of it in water down the perſon's throat.

HARVEST, the time or ſeaſon that the corn is ripe, and fit to be reaped and taken into barns.

HARVEST-FLY, in zoology, a large four-winged fly, of the cicada kind, very common in Italy, and erroneouſly ſuppoſed to be a graſs-hopper. See CICADA.

HASSIDEANS, or ASSIDEANS, an appellation given to thoſe Jews who reſorted to Mattathias, to fight for the law of God and the liberties of their country.

HASTA, among medalliſts, a kind of javelin, not ſhod or headed with iron; or rather an ancient ſort of ſcepter, longer than ordinary, occaſionally given to all the gods.

HASTATED LEAF, among botaniſts, one reſembling the head of an halbert.

HAT, a covering for the head, chiefly made of hair, wool, &c. worked, fulled, and faſhioned to the figure of the head, and worn by the men throughout the weſtern part of Europe.

Hats are ſaid to have been firſt ſeen about the year 1400; at which time they became of uſe for country wear, riding, &c.

F. Daniel relates that, from the reign of Charles II. in 1449, the uſe of hats and caps is to be dated, which then began to take place of chaperoons and hoods. In proceſs of time the cuſtom paſſed from the laity to the clergy, but this was looked upon as a crying abuſe, and ſeveral regulations were publiſhed to prohibit it, enjoining them to keep to the uſe of chaperoons, made of black cloth, with decent cornets faſtened to their hats; and this upon pain of ſuſpenſion and excommunication. It is true, the uſe of hats is ſaid to be of a longer ſtanding, among the eccleſiaſtics of Brittany, by two hundred years; but theſe were no other than a kind of caps, whence aroſe the ſquare cap now uſed in colleges.

Method of making HATS.—Hats are made either of wool, or the hair of divers animals, as the beaver, hare, rabbit, camel, &c. The proceſs is much the ſame in all. The fineſt hats are made of the pure hairs of the beaver; women tear off the long hair with a knife, like a ſhoe-maker's knife, and the ſhort hair they ſcrape off with another kind of knife: then they mix one-third of dry caſtor to two-thirds of old coat, which is a ſkin that has been worn ſome time by the ſavages. This ſtuff, ſo mixed, is carded, and weighed out into parcels, according to the ſize and thickneſs of the hat intended: then each parcel is teazed with the bow-ſtring to purify it from all filth, and to make the ſtuff fall preciſely together, which is the moſt difficult part of the work. Thus they form hats of an oval figure, ending at top in an acute angle. With what ſtuff remains, they ſtrengthen them where they happen to be ſlender. They purpoſely make them thicker in the brim near the crown, than towards the circumference, or crown itſelf. They next harden the hats into cloſer flakes, by preſſing down the hardening leather upon them; after which they are carried to the baſon, upon which, laying one hat at a time, they ſprinkle it over with water, and mould it: the heat of the fire, the water, and the preſſing,

embody

embody the ſtuff into a ſlight airy felt. The maker, having turned up the edges of this felt round the mould, lays it by and takes another, which, when reduced to the ſame conſiſtence and form, he joins them together, ſo as to meet in an angle at top, making only one conical cap.

The next proceſs is to remove the hat to the receiver, or trough, upon the plank or ſloping ſide of which the baſoned hat is laid, being firſt dipped in the kettle: here the hatter rolls and unrolls it, one part after another, firſt with the hand, and then with a little wooden roller, dipping it from time to time for four or five hours, before it can be properly fulled: in which violent labour the workmen have their hands guarded with thick leather, called gloves. A hat thus wrought is reduced to a proper ſhape on the block tied down by a commander, and all under this ſtring is left for the brim; then it is ſet to dry; and when dry enough, it is ſinged by holding it over a flare of ſtraw, &c. then pounced to take off the coarſer nap; then they uſe the ſeal-ſkin; and, laſtly, card it to raiſe the fine cotton; then fitting it to the block, they tie it, cut round the edges, and ſend it to the dyer's, who boils it in a copper that holds between ten and twelve dozen, with a dye of logwood, verdigriſe, copperas, alder-bark, galls, and ſumac, for three quarters of an hour at a time, for ten or twelve times ſucceſſively, taking every hat out after each boiling. The dyer returns it to the maker, who hangs it to dry in the roof of a ſtove, under which is a charcoal fire; and thus prepares it for ſtiffening, which is done with melted glue, or gum ſeneca, ſmeared over it with a bruſh, and rubbed in with the hand; then ſpreading a cloth over the ſteaming-baſon, and ſprinkling it with water to raiſe a ſtrong ſteam to force in the ſtiffening, it is placed thereon brim downwards; and when it is moderately hot, the workman ſtrikes gently on the brim with the flat of his hand, to make the jointings incorporate, turning it this way and that, ſetting it at laſt on the crown: then it is put on the block, bruſhed and ironed on the ſtall-board, and thus finiſhed ready to be lined.

HAT is alſo uſed in a figurative ſenſe, to ſignify the dignity of a cardinal, or a promotion to that dignity.

HATS are alſo made for women's wear, of chips, ſtraw, or cane, by platting, and ſewing the plats together; beginning with the center of the crown, and working round till the whole is finiſhed. Hats for the ſame purpoſe are alſo wove and made of horſe-hair, ſilk, &c.

HATCHEL, or HITCHEL, a tool with which flax and hemp are combined into fine hairs. It conſiſts of long iron pins, or teeth, regularly ſet in a piece of board.

There are ſeveral ſorts of hatchels, each finer than the other, with which flax and hemp are prepared for ſpinning. See FLAX and HEMP.

HATCHES, or HATCH-WAYS, certain holes in the decks of a ſhip, through which the cargo paſſes into the hold and lower apartments: hatches are alſo the covers which lie over theſe holes.

HATCHET, a ſmall light ſort of an ax, with a baſil-edge on its left ſide, and a ſhort handle, as being to be uſed with one hand.

Hatchets are uſed by various artificers, and more particularly in hewing of wood.

HATCHING, the action whereby fœcundated eggs, after a proper time of incubation, exclude their young.

The learned M. Reaumur has obliged the world with an ingenious treatiſe on the method of hatching chickens by an artificial heat.

HATCHING, or HACHING, in deſigning, &c. the making of lines with a pen, pencil, graver, or the like; and the interſecting, or going acroſs thoſe lines with others drawn a contrary way, is called counter-hatching. The depths and ſhadows of draughts are uſually formed by hatching.

Hatching is of ſingular uſe in heraldry, to diſtinguiſh the ſeveral colours of a ſhield, without being illuminated: thus, gules or red is hatched by lines drawn from the top to the bottom; azure, by lines drawn acroſs the ſhield; and ſo of other colours. See the articles GULES, AZURE, &c.

HATCHMENT, in heraldry, a name ſometimes uſed for an atchievement, or eſcutcheon over a gate, door, or on the ſide of an houſe.

HATCHMENT alſo ſignifies the marſhalling of ſeveral coats of arms in an eſcutcheon. See the article MARSHALLING.

HATTOCK, a ſhock of corn containing twelve ſheaves: others make it only three ſheaves laid together.

HAVEN, a ſea-port or harbour. See the article HARBOUR.

HAVER, a term uſed by country people for oats.

HAUNCH, or HANCH, the hip, or that part of the body between the laſt ribs and the thigh.

HAUNT, among ſportſmen, the place to which game are accuſtomed to reſort: among hunters, it is the walk of a deer, or the place of his ordinary paſſage.

HAUTBOY, a muſical inſtrument of the wind kind, ſhaped much like the flute, only that it ſpreads and widens toward the bottom, and is ſounded thro' a reed. The treble is two feet long; the tenor goes a fifth lower, when blown: it has only eight holes; but the baſs, which is five feet long, has eleven.

HAW, in botany, &c. a common name for the fruit of the white-thorn. See the article MESPILUS.

HAW, in farriery, is a ſwelling and ſponginess that grows in the inner corner of the eye of a horſe, ſo large ſometimes as to cover a part of the eye.

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The method of curing it is eaſily performed by cutting part of it away; but the farriers are apt to cut away too much: the wound may be dreſſed with honey of roſes; and if a fungus or ſpongy fleſh ariſes, it ſhould be ſprinkled with burnt allum, or touched with blue vitriol.

HAWK, a ſynonymous term with falcon, though, by ſome, reſtrained to the leſſer ſort of falcons. See FALCON.

HAWKER, in commerce, a pedlar, or perſon that goes about the country ſelling wares: this name is ſaid to ariſe from their uncertain wandering, like perſons, who, with hawks, ſeek their game where they may find it.

HAWKING, the exerciſe of taking wild-fowl by means of hawks.

HAWKWEED, in botany. See the article HIERACIUM.

HAWSE, in naval architecture, that part of a ſhip's bow through which the cable paſſes, and is drawn into and let out of the ſhip.

HAW-THORN, in botany. See MESPILUS.

HAY, any kind of graſs, cut and dried, for the food of cattle.

Whatever uplands are deſigned to be mowed for hay, are to be ſhut up in the beginning of February, and no cattle ſuffered to come upon them afterwards; but meadows and marſh lands, where the graſs grows quicker, need not be ſhut up till April, except the ſpring be bad; and many farmers feed thoſe meadows which are in danger of overflowing till the firſt of May, and then ſhut them up for mowing.

In ſpring, the ſtones, ſticks, and all other kinds of foulneſs that lie upon the land, are to be picked up, and the mole-hills all levelled and ſpread, becauſe they hinder the mowers. If the meadows lie any thing uneven, or if they have been trodden down in winter, they ſhould be rolled all over with a large wooden roller; the mowers will then be able to cut much cloſer; for this, and the quantity of the hay, will very well anſwer the trouble.

The time of mowing the graſs muſt be proportioned to its ripeneſs; nothing can be more prejudicial to the crop, than the cutting it too ſoon, becauſe the ſap is not then fully come out of the root; and ſuch graſs, when dried into hay, ſhrinks up almoſt into nothing. It is very wrong alſo to let it ſtand too long, for, when the ſeed has been ripened, and is ſhed, the moiſture of the ſap all dries away out of the ſtalks, and they become no better than ſo much ſtubble; as is plainly ſeen in thoſe graſſes which grow in hedges, and, not being mowed, die away after they have perfected their ſeeds, and become taſteleſs and very different from hay. The middle or latter end of June is the general ſeaſon for mowing; and the red flowers of the honey-ſuckle beginning to wither, generally give the farmer notice that the time is coming on. But he may be more aſſured of this, by the drops or heads of the graſs looking full, bending downward, and looking brown; it is then in the proper ſtate to be cut down.

If there is great plenty of the hay, and it lie thick in the ſwath, the hay-makers ſhould follow the mowers, and turn the ſwaths, as they cut them, unleſs there ſeems danger of wet weather; but in that caſe it is better to let them lie in the ſwath. At night it muſt be made up into little cocks, and theſe in the morning muſt be ſpread and turned, ſo that the other ſide may wither. After this, it is to be made into ſmall cocks again, and the next day ſpread again, and drawn into long rows, which they call winrows. From theſe it is to be made up into large cocks, after a little drying; and theſe large ones, if any wet comes, are to be ſpread open once again, before they are carried in.

Mowing of land too often, or continuing it too long, is a very great prejudice to it, unleſs it have the advantage of being fed and renewed by land-floods at times. The farmer who has not this advantage to his lands, ſhould feed them once in two or three years, inſtead of making hay from them, unleſs he chuſes to lay on manure conſtantly to keep them in heart. Feeding the hay-lands is the ſame ſort of reſpite that fallowing is to corn-lands, both very neceſſary and advantageous.

HAY-BOTE, in law, a liberty to take thorns and other wood, to make and repair hedges, gates fences, &c. by a tenant for life or years.

HAY-BOTE is alſo taken for wood for the making of rakes and forks, uſed in making hay.

HAYWARD, the perſon who keeps the common herd or cattle of a town.

He is appointed by the lord's court, and his office is to ſee that the cattle neither break nor crop the hedges of incloſed grounds; he is alſo to look to the fields, and impound cattle that commit treſpaſs therein.

HAZARD, a game on dice, without tables, is very properly ſo called, ſince it ſpeedily makes a man, or ruins him.

It is played with only two dice; and as many may play at it as can ſtand round the largeſt round table. It is certainly one of the moſt bewitching and ruinous games played on the dice. Happy, therefore, the man who either never heard of it, or who has reſolution enough to leave it off in time. See CHANCE and GAMING.

HAZLE, *Corylus*, in botany, a well known plant, which grows common in England in the woods and hedges; it produces male and female flowers, growing at remote diſtances on the ſame tree: the flowers are diſpoſed in the form of an amentum; the female flowers are ſeſſile, and included in the germ: they have neither corolla nor peri-

carpium. The fruit is a ſubovate nut, with a deraded baſe, and at the top a little compreſſed and acuminated.

Witch-HAZLE, a name ſometimes given to the elm. See ELM.

HAZLE-EARTH, in agriculture, a moderately compact earth, much approaching to the nature of the chiſely ſoil, and indeed properly a ſpecies of it, but always containing a large quantity of reſin-coloured ſand.

HEAD, *Caput*, the uppermoſt or foremoſt part of the body of an animal. When viewed on the outſide, it is divided into the hairy ſcalp and the face. The hairy ſcalp covers the upper part of the os frontis, the oſſa parietalia, the os occipitis, and the upper and lower portions of the temporal bones. The uppermoſt part of the hairy ſcalp is termed the vertex or fontanella; the back part, occiput; the lateral parts, the temples. See CRANIUM.

HEAD-MOULD-SHOT, a diſeaſe in children, wherein the ſutures, generally the coronal, have their edges ſhot over each other, ſo as to compreſs the internal parts. This diſeaſe uſually occaſions convulſions, and admits of no cure, unleſs room could be given by a divulſion of the ſutures. This diſorder is oppoſite to the horſe-ſhoe head. See the article HORSE-SHOE-HEAD.

HEAD is alſo uſed for the top or extremity of any thing; thus we ſay, the head of a tree, the head of a bone, the head of a nail, &c.

HEAD, in architecture, an ornament of carved work, or ſculpture, frequently ſerving as the key of an arch, or platband, on another occaſion.

HEAD, among huntſmen, is uſed for the horns of a deer, as a hart, buck, &c. See ANTLERS, ROYALS, CROCHES, &c.

HEAD, in the military art. Head of a work is the front of it next the enemy, and fartheſt from the place, as the front of a hornwork is the diſtance between the flanked angles of the demi-baſtions; the head of a double tenaille is the ſaliant angle in the middle; and the two other ſides which form the re-entering angles. See the article FRONT.

HEAD, in painting, ſculpture, &c. a repreſentation of that part of the human body, whether in colours, draught, or creux: if taken from the life, or ſuppoſed to bear a juſt reſemblance to the perſon, it is more properly called portrait. See the article PORTRAIT.

HEAD-BOROUGH, the perſon who is chief of the frank-pledge in boroughs, or who anciently had the government within his own pledge. See the article FRANK-PLEDGE.

HEAD-BOROUGHS, at this time, are a kind of conſtables. See CONSTABLE.

HEAD-LAND, in huſbandry, is taken to ſignify the upper-part of the land left for the turning of the plough.

HEAD-TIN, in metallurgy, a preparation of tin-ore toward the fitting it for working into metal. When the ore has been pounded and twice waſhed, that part of it which lies uppermoſt, or makes the ſurface of the maſs in the tub, is called head-tin: this is ſeparated from the reſt, and after a little more waſhing becomes fit for the blowing-houſe.

Moor's HEAD, is underſtood of a horſe with a black head and feet; the body being uſually of a roan colour. Among engineers a Moor's head is uſed for a kind of bomb or granado, ſhot out of a cannon. Among chemiſts it is a cover, or capital, of an alembic; having a long neck to convey the vapours raiſed by the fire into a veſſel, which ſerves as a refrigeratory. See ALEMBIC.

Dragon's HEAD, in aſtronomy, &c. is the aſcending node of the moon, or other planet. See the article NODE.

HEADS, a term uſed by builders for that kind of tile which they uſe to lay at the eaves of a houſe; being the full breadth of a common tile, and but half a tile in length. See the article TILE.

HEALING, in architecture, the covering a roof with lead, tiles, ſlate, or the like.

HEALTH, *Hygieio*, *Hygeia*, a proper diſpoſition of the body, and all its parts, for performing their reſpective functions; and this conſiſts in a due connexion. It is likewiſe applied to the mind, and then it means a juſt diſpoſition of the rational powers and paſſions to perform their proper actions; and this, in a great meaſure, depends on bodily health.

The preſervation and reſtoration of health conſtitute the objects of the arts of medicine. The continuance of health depends principally on the ſix non-naturals, air, food, exerciſe, the paſſions, evacuation and retention, ſleeping and waking. The ancients erected a goddeſs, to whom they ſuppoſed the care of health to belong: the Greeks worſhipped her under the name Υγιεια, and the Romans under that of Salus. Her temple at Rome was on the Mons Quirinalis, where ſhe had a ſtatue crowned with medical herbs.

She is repreſented in medals with a ſerpent ſtretched on her left arm, and holding a patera to it with the right: ſometimes ſhe has an altar before her with a ſerpent twiſted round, raiſing its head to take ſomething out of the ſame, with the inſcription SAL. AUG.

HEAM denotes in animals the ſame as after-birth or ſecundines in women.

HEARING, *Auditus*, one of the external ſenſes, being the act or faculty of perceiving ſounds; its organ is the ear, particularly the auditory nerve diffuſed through it; its objects are certain vibrations of the air. See the article SOUND.

The ear and its ſeveral membranes, nerves, canals, &c. are vehicles for the reception, modification,

tion, and tranſmiſſion of ſound to the brain, which is the ſeat of this ſenſe. See EAR.

HEARSE, among ſportſmen, a hind of the ſecond year of her age. See HIND.

HEART, *Cor*, in anatomy, a muſcular body ſituated in the cavity of the thorax, on the anterior part of the diaphragm, between the two laminæ of the mediaſtinum. It is ſomewhat conical, flatted on the ſides, round at the top, and oval at the baſis; this laſt is accompanied with appendices, called auriculæ, and by large blood-veſſels; and all theſe are included in a membranous capſula, named pericardium.

It is hollow within, and divided by a ſeptum, which runs between the edges into two cavities; one of which is thick and ſolid, called the left ventricle; the other thin and ſoft, termed the right ventricle; though in their natural ſituation, the right ventricle is placed more anteriorly than the left. Each ventricle opens at the baſis by two orifices, one of which anſwers to the auricles, the other to the mouth of a large artery; one of which may be termed the auricular orifice, the other the arterial orifice. The right ventricle opens into the right auricle, and into the trunk of the pulmonary artery; the left into the left auricle, and into the great trunk of the aorta. At the edges of theſe orifices are ſeveral moveable pellicles, called valves, of which ſome are turned inward towards the ventricles, that let the blood enter the heart, but hinder it from going out the ſame way, and are called triglochines or tricuſpides; others turned towards the great veſſels, which ſuffer the blood to go out of the heart, but hinder it from returning, and are called ſemi-lunares or ſigmoidales. The tricuſpides of the left ventricle are likewiſe termed nitrales.

The inner ſurfaces of the ventricles have thick fleſhy productions called columnæ. To the extremities of theſe columnæ or pillars are faſtened ſeveral tendinous cords, the other ends are joined to the tricuſpides. There are likewiſe other ſmall, ſhort, tendinous ropes along both the edges of the ſeptum, in an obliquely tranſverſe ſituation, forming a kind of net-work.

The cavities of the ventricles are ſmall deep foſſulæ, near each other, with ſmall prominent interſtices between. The greateſt part of the foſſulæ are orifices of the venous ducts.

The fleſhy fibres of the heart, eſpecially thoſe of the right ventricle, are either bent into arches, or folded into angles, the latter being longer than the former. The middle of theſe arches, and the angles of the folds, are turned towards the apex of the heart; and the extremities of the fibres toward the baſis. Theſe fibres not only differ in length, but in their directions, which are very oblique in all, but much more ſo in the long or folded fibres than in the ſhort ones.

Each ventricle is compoſed of its proper diſtinct fibres; but the left has many more than the right. By carefully unravelling all the fibres of the heart, we find it to be made up of two bags contained in a third.

The tubes which croſs tranſverſely are much more numerous than thoſe which croſs longitudinally; which will ſerve to rectify the falſe notion about the motion of the heart, that it is performed by a contortion like a ſcrew; that the heart is ſhortened in the time of contraction, and lengthened in dilatation.

The tricuſpidal valves of the right ventricle are three triangular productions, very ſmooth on that ſide next the auricle, and on the ſide next the ventricle ſeveral membranous and tendinous expanſions, and their edges notched. The valves of the auricular orifice of the left ventricle are of the ſame ſtructure, and but two in number.

The ſemi-lunar valves are ſix in number, three belonging to each ventricle, ſituated at the mouths of the great arteries, and may be properly enough called valvulæ arteriales.

The auricles are muſcular bags, ſituated at the baſis of the heart, one towards the right ventricle the other towards the left, and joined together by an inner ſeptem and external communicating fibres, much like the ventricles; one of them being called the right auricle, the other the left. They are very uneven on the inſide, but ſmoother on the outſide, and terminate in a narrow, flat, indented edge, like a cock's comb.

The right auricle is larger than the left, and it joins the right ventricle by a common tendinous opening. It has two other openings united into one, and formed by two large veins, which meet and terminate there, almoſt in a direct line, called vena cava, ſuperior and inferior: the notched edge of this auricle terminates obliquely in a kind of obtuſe point, which is a ſmall production of the great bag, and is turned towards the middle of the baſis of the heart.

The whole inner ſurface of the right auricle is uneven, by reaſon of a great number of promenent lines, which run acroſs the ſides of it, and communicate with each other by ſmaller lines, which lie obliquely in the interſtices between the former.

The left auricle is pretty thick and unequally ſquare, into which the four veins open that are called venæ pulmonares, and which has a diſtinct appendix belonging to it, like a third ſmall auricle.

Beſides the great common veſſels, the heart has ſome peculiar to itſelf, called the coronary arteries and veins, as in ſome meaſure they crown the baſis of the heart. Theſe arteries, which are two in number, called the right and left coronaries, go out from the beginning of the aorta, and afterwards

ſpread

ſpread round the baſis of the heart, to the ſubſtance of which they ſend numerous ramifications. The exterior courſe of the vein is pretty much the ſame with that of the arteries; their trunk opens principally into the right auricle, by a particular orifice, furniſhed with a ſemi-lunar valve: all the coronary veſſels and their ramifications communicate with each other. The pericardium conſiſts of three laminæ, the middle and principal of which is compoſed of very fine tendinous filaments croſſing each other in different directions. The external lamina ſeems to be a continuation of the outer coat of the heart, auricles, and great veſſels.

The pericardium is cloſely connected to the diaphragm, not at the apex, but exactly at that place which anſwers to the flat or lower ſide of the heart; the reſt of the bag lies upon the diaphragm without any adheſion. The external lamina, or more properly common covering, is formed by the duplicature of the mediaſtinum. The internal lamina is perforated by an infinite number of very ſmall holes, through which a ſerous fluid continually tranſudes, in the ſame manner as in the peritonæum: ſometimes, upon diſſection, it is of a reddiſh colour, which may be owing to a tranſudation of blood through the fine membrane of the auricles.

The heart and parts belonging to it are the principal inſtruments of the circulation of the blood. The two ventricles ought to be conſidered as two ſyringes ſo cloſely joined together as to make but one body, and furniſhed with ſuckers in contrary directions to each other; ſo as that, by drawing one of them, a fluid is let in, and forced out again by the other.

The heart is made up of a ſubſtance capable of contraction and dilatation. When the fleſhy fibres of the ventricles are contracted, the two cavities are leſſened in an equal and direct manner, more according to the breadth or thickneſs, than according to the length of the heart; becauſe the numbe o tranſverſe fibres is much greater than that of the longitutudinal ones.

The fleſhy fibres, thus contracted, do the office of ſuckers, by preſſing upon the blood in the ventricles; which blood being forced to the baſis of the heart, preſſes the tricuſpidal valves againſt each other, opens the ſemi-lunares, and ruſhes with impetuoſity through the arteries of their ramifications, as through ſo many elaſtic tubes. The blood, thus puſhed on, enters the capillary veſſels, and is from thence forced to return by the veins to the auricles, which, like retirements, lodge in the blood returned by the veins during the time of a new contraction, which is termed ſyſtole.

The contraction or ſyſtole ceaſes immediately; and in that time the auricles, which contain the venous blood, being contracted, force the blood thro' the tricuſpidal valves into the ventricles, the ſides of which are thereby dilated, and this dilatation is called diaſtole. In this manner does the heart perform the circulation, and that three different ways: the firſt, and moſt univerſal kind of circulation, is that by which almoſt all the arteries of the body, are filled by the ſyſtole of the heart, and the greateſt part of the veins evacuated by the diaſtole.

The ſecond kind of circulation, oppoſite to the firſt, is through the coronary veſſels of the heart, the arteries of which are filled with blood, during the diaſtole of the ventricles, and the veins emptied during the ſyſtole.

The third kind is that of the left ventricle of the heart, through the venous ducts of which a ſmall quantity of blood paſſes, without going through the lungs, which is the courſe of all the remaining maſs of blood. *Winſlow.*

HEARTS-EASE, in botany. See VIOLA.

HEAT, *Calor*, one of the qualities of the body, oppoſed to cold. Its preſence is known, and its degree meaſured by the expanſion of the air or ſpirit in the thermometer. It is properly a ſenſation excited in us by the action of fire, ſo that it is a particular modification of our minds, and not any thing exiſting in that form in the body that occaſions it. Heat, in the body that communicates it, is only motion; in the mind, a particular diſpoſition of the ſoul.

Heat, with reſpect to the effect produced on us, is eſtimated by its relation to the organ of feeling, no object appearing to be hot, unleſs its heat exceed that of our bodies.

HEAT, in geography. The diverſity of the heat of climates and ſeaſons ariſes from the different angles, under which the ſun's rays ſtrike on the earth's ſurface.

It is ſhewn in mechanics, that a moving body ſtriking perpendicularly on another, acts on it with all its force; and that a body ſtriking obliquely acts with the leſs force, the more it deviates from the perpendicular. Now fire, moving in right lines, muſt follow the ſame law, and conſequently its action muſt be meaſured by the ſine of the angle of incidence: and hence fire, ſtriking on any obſtacle in a direction parallel thereto, has no ſenſible effect, by reaſon the ratio is almoſt infinite, that is, nothing.

Hence Dr. Halley gives a mathematical computation of the effect of the ſun under different climates and ſeaſons, going on this principle, that the ſimple action of the ſun, as all other impulſes, is more or leſs forcible, according to the ſines of the angles of incidence, or to the perpendicular let fall on the plane: whence the vertical ray being put for radius, the force of the ſun on the horizontal ſurface of the earth will be to that, as the ſine of the ſun's altitude at any other time. Hence it follows, that the time of the continuance of the ſun's ſhining being taken for a baſis, and the ſines of the ſun's altitudes

erected thereon as perpendiculars, and a curve drawn through the extremities of those perpendiculars, the area comprized therein will be proportional to the collection of the heat of all the sun's beams in that space of time.

Hence it will also follow, that under the pole the collection of all the heat of a tropical day is proportionate to a rectangle of the sine of 23 degrees and a half into 24 hours, or the circumference of a circle; that is, the sine of 23° and $\frac{1}{2}$ being nearly $\frac{4}{10}$ of radius, as $\frac{8}{10}$ into 12 hours: or the polar heat is equal to that of the sun continuing 12 hours above the horizon at 53° height, than which the sun is not five hours more elevated under the equinoctial.

But whereas the nature of heat is to remain in the subject, after the luminary is removed, and particularly in the air; under the equinoctial, the 12 hours absence of the sun does but little diminish the motion impressed by the past action of his rays, before he rises again: but under the pole, the long absence of the sun for six months, wherein extreme cold obtains, hath so chilled the air, that it cannot, before the sun has got far towards it, be any ways sensible of his presence, his beams being obstructed by thick clouds and perpetual fogs. Add to this, that the different degrees of heat and cold in different places depend, in a great measure, upon the accident of situation with regard to mountains, vallies, &c. the first greatly helping to chill the air by the winds that blow over them, and which come in eddies through the adjoining levels. Mountains sometimes have the effect of a burning mirrour on the adjacent plane, and the same effect is sometimes produced from the concave or convex parts of clouds, either by refraction or reflection. And some take these to be sufficient to produce thunder, lightning, &c.

A stony, sandy, or chalky soil reflects most of the rays into the air again, and retains but few, whereby a considerable accession of heat is made to the air; as, on the contrary, black earths absorb most of the rays and return few into the air.

HEAT, in the animal œconomy, known by the several names of natural heat, vital heat, innate heat, and animal heat, is commonly supposed to be that generated by the attrition of the parts of the blood, occasioned by its circulatory motion, especially in the arteries.

To what organs, or operations, the heat of the human body, and other animal bodies, is owing, is hitherto extremely doubtful. The opinions that at present prevail are, 1. That the heat of animal bodies is owing to the attrition betwixt the arteries and the blood. 2. That the lungs are the fountain of this heat. 3. That the attrition of the parts of the solids on one another produce it. 4. That it is owing to the mechanical attrition of the particles of our fluids. To which opinions Dr. Stevenson of Edinburgh, adds a 5th, viz. That whole process by which our aliment and juices are constantly undergoing some alteration.

HEATH, in botany. See ERICA.

HEAVEN, *Cœlum*, that orb over our heads where the heavenly bodies revolve. Philosophers, divines, and astronomers, lay down divers heavens, as the highest or empyrean heaven, the æthereal or starry heaven, and the planetary heaven.

HEAVEN, among divines, called the empyrean, is the abode of God, and blessed spirits, such as angels, and the souls of the righteous deceased. This in scripture is frequently called the kingdom of heaven, the heaven of heavens, the third heaven, paradise, the new Jerusalem, &c. This heaven is conceived as a place where the Deity is pleased to afford a more immediate view of himself than in the other parts of the universe, where he is likewise present. This makes the beatific vision. The inspired writers, particularly Isaiah and St. John the divine, give us very magnificent descriptions of heaven, its structure, apparatus, and attendance. Eusebius charges Plato with borrowing his description of heaven, *in Dial. de Anima*, from the scriptures, so near is the resemblance.

HEAVEN, in astronomy, called the æthereal and starry heaven, is that immense region where the stars, planets, and comets are ranged.

Sir Isaac Newton has abundantly shewn the heavens to be void of all resistance, and consequently almost all matter, from the planets persisting in their motions without any sensible diminution of their velocity, and the comets passing freely in all directions.

The ancient astronomers assumed as many heavens as they observed different motions therein; all which they supposed solid and spherical. Thus, there were seven heavens for the seven planets; the eighth was for the fixed stars, which they called firmament: Ptolemy adds a ninth, which he called the primum mobile. K. Alphonsus added two cryſtalline heavens to account for some irregularities in the heavenly motions; and, lastly, an empyrean heaven was drawn over the whole for the residence of the Deity.

The cryſtalline heavens were supposed to have no stars fixed in them; they encompassed the inferior, starry, and planetary heavens, communicating their motion thereto. The first served to account for that slow motion of the fixed stars, whereby they advance a degree eastward in seventy years: whence the precession of the equinoxes. The second was to solve the phænomena of libration or trepidation.

Eudoxus supposed twenty-three heavens, Calippus thirty, Regiomontanus thirty-three, Aristotle forty-seven, and Fracastor seventy.

The astronomers did not much concern themselves

bout the reality of these heavens, provided they erved to account for any of the celestial motions, and agreed with phænomena.

HEAVING, among seamen, the act of turning a windlass or capstern by the help of long bars thrust into holes or mortices cut in the bodies of them. See the articles WINDLASS and CAPSTERN.

HEAVING *a-head*, drawing a ship a-head by heaving in the cable, and thereby making her advance towards the anchor or other place where the cable or rope which draws her onward is fastened.

HEAVING-DOWN, the same with careening. See CAREENING.

HEBDOMARY, a solemnity of the ancient Greeks, in honour of Apollo, in which the Athenians sung hymns to that god, and carried in their hands branches of laurel. The word signifies the seventh day, this solemnity being observed on the seventh day of every lunar month.

HEBRAISM, an idiom or peculiar manner of expression in the Hebrew language.

HEBREW, or HEBREW-LANGUAGE, that spoken by the ancient Jews, and wherein the Old Testament is wrote.

This appears to be the most ancient of all languages in the world, at least we know of none older: and some learned men are of opinion that this is the language in which God spoke to Adam in Paradise, and in which the saints will speak in heaven.

HEBREWS, or *Epistle to the* HEBREWS, a canonical book of the New Testament.

Though St. Paul did not prefix his name to this Epistle, the concurrent testimony of the best authors, ancient and modern, afford such evidence of his being the author of it, that the objections to the contrary are of little or no weight.

The Hebrews, to whom this Epistle was wrote, were the believing Jews of Palestine, and its design was to convince them, and, by their means, all the Jewish converts, wheresoever dispersed, of the insufficiency and abolishment of the ceremonial and ritual law. In order to which he undertakes to shew, first, the superior excellency of Christ's person above that of Moses: secondly, the superiority of Christ's priesthood above the levitical: thirdly, the mere figurative nature, and utter insufficiency of the legal ceremonies and sacrifices: and, fourthly, that to forsake the Mosaical law, was not, as the Jews boldly asserted, to apostatize from God, but was their indispensible duty and obligation. These particulars are intermixed with proper inferences and exhortations, all tending to shew the Jewish Christians the unreasonableness, folly, and danger of relapsing into Judaism.

HECATOMB, *Hecatombe*, in antiquity, a sacrifice of an hundred oxen, at as many altars, and by as many priests.

Pythagoras we are told sacrificed a hecatomb to the muses, for joy of discovering the demonstration of the 47th Prop. of Euclid's first book.

HECKLE. See HATCHEL.

HECKLING *of Hemp and Flax*. See HEMP and FLAX.

HECTIC, or HECTIC FEVER. See *Slow* FEVER.

HEDERA, ivy, in botany. See IVY.

HEDERA TERRESTRIS, ground ivy, a genus of plants called by Linnæus glechoma. See GLECHOMA and GROUND IVY.

HEDGE, in agriculture, a fence inclosing a field or garden, made of bushes, boughs, &c. interwoven together.

The word is Saxon, *hegge*, or *hege*, which literally signifies circumference or inclosure.

For quickset hedges, hawthorn is allowed to be the best of all the English shrubs. The best method of raising this for use, is to put the haws into the ground as soon as ripe, and cover them with earth; and by the spring twelvemonth, the shoots will be fit to transplant from the seed-plot into hedge-rows. The crab-tree is a common mixture with the hawthorn in hedges; but grows faster than the hawthorn, and requires cutting to keep the hedge even. The young hawthorns raised from seed always thrive better than those picked up wild in the fields. *Moreton's Northampt.*

The great consideration, in making quick-set hedges, is to bring the plants from a worse soil than that in which it is intended to set them. They must be about the thickness of one's thumb, well rooted and strong, and must be planted about four or five inches out of the ground. If there be a ditch to the hedge, it should be three feet wide at the top, one at the bottom, and two deep; and, if wider, then deeper in proportion.

If the bank be without a ditch, the plants should be set in two rows at a foot distance below one another. The turf is to be laid with the grass side downward on that side of the ditch on which the bank is designed to be made, and some of the best mould must be laid upon it to bed the quick; then the quick is to be laid upon it a foot asunder, so that the end of it may be inclining upwards; and at equal distances of thirty feet, plant an ash, oak, crab, or elm, to grow with the quick. When the first row of quick is laid, it must be covered with mould, and the turf laid upon it as before, and some more mould upon that; so that when the bank is a foot high, another row of sets may be laid against the spaces of the lower quick. These must be then covered as the former, and the bank is to be then topped with the bottom of the ditch, and a dry or dead hedge laid, to shade the under plantation. There should then be stakes driven into the loose earth quite down to the firm ground, at about two feet and a half distance from each other;

other; oak ſtakes are accounted the beſt of all for uſe, and, the next to this, thoſe of black-thorn or ſallow. Small buſhes are to be laid below, but not too thick, only to cover the quick from being injured as it ſhoots.

HEDYOTIS, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped, with four ſubulated ſtamina inſerted in the corolla. The fruit is a bilocular capſule, containing a few angular ſeeds.

HEDYSARUM, the French honeyſuckle, in botany, a genus of plants producing papilionaceous flowers. The fruit is a bivalve articulate pod, containing at each joint (which is compreſſed and roundiſh) one kidney-ſhaped ſeed. There are ſeveral ſpecies belonging to this genus; that which is beſt known in our gardens is a biennial plant, and flowers the ſecond year; it ſends forth ſeveral branching ſmooth hollow ſtalks, about two or three feet high; theſe are furniſhed with winged leaves, compoſed of five or ſix pair of oval lobes, terminated with an odd one; from their baſe comes out the foot-ſtalks, which are five or ſix inches long, ſuſtaining ſpikes of beautiful red flowers. It blows in June or July, and the ſeeds ripen in September. They are propagated by ſowing the ſeeds in the ſpring.

HEEL, in anatomy, the hinder-part of the foot. See FOOT and CALCANEUM.

HEEL *of a Horſe*, the lower hinder part of the foot, comprehended between the quarters, and oppoſite to the toe.

HEEL *of a Maſt*, the foot or lower end of it.

HEEL *of a Ship*, the hindmoſt or aftmoſt part of a ſhip's keel.

HEELING, in the ſea-language, ſtooping or inclining to one ſide, either by the preſſure of ſail at ſea, or to clean the ſhip's bottom, &c. See the article CAREEN and BOOT-TOP.

HEGIRA, in chronology, a celebrated epocha among the Arabs and Mahometans.

The word is Arabic, *hagirah*, which ſignifies flight.

The event which gave occaſion to this epocha was Mahomet's flight from Mecca; the magiſtrates of this city, fearing this impoſtor might raiſe a ſedition, expelled him on the 15th or 16th of July, in the year 622, being the 14th year of his aſſuming the character of prophet, and under the emperor Heraclius.

There is an earlier Hegira in the ſame year, when Mahomet and his diſciples relinquiſhed Medina. Both theſe hegira's the Mahometan's call hegiratan.

HEIGHT, *altitudo*, in geometry. See the article ALTITUDE.

HEIR, *Hæres*, in law, ſignifies a perſon who ſucceeds another by deſcent to lands, tenements, hereditaments, being an eſtate of inheritance, or an eſtate in fee; becauſe nothing paſſes by right of inheritance but in fee.

HEIR-APPARENT is a perſon ſo called in the life-time of his anceſtor, at whoſe death he is heir at law.

HEIRESS, a female heir to one who has an eſtate in lands, &c. Stealing an heireſs, and marrying her againſt her will, was declared felony by 3 Hen. VII.

HEISTERIA, in botany, a genus of plants, whoſe flower conſiſts of five ovate concave patent petals, with ten filaments topped with roundiſh antheræ. The fruit is an oblong drupe, depreſſed at the top, containing an oval obtuſe nut.

HELENIUM, baſtard ſun-flower, in botany, a genus of plants, whoſe flower is compound and radiated; the corollulæ, which form the diſc, are numerous and hermaphrodite, of a tubulous form, and quinquedentated at the limb; the female florets which compoſe the rays, are linear, ligulated, and trifid at the point; the ſtamina are five ſlender and very ſhort filaments, topped with cylindrical anthæra; the ſeeds are ſingle, and placed on a convex naked receptacle.

HELENIUM is alſo uſed ſometimes for elecampane. See ELECAMPANE.

HELEPOLIS, in the ancient art of war, a machine for battering down the walls of a place beſieged, the invention of which is aſcribed to Demetrius the Poliorcete.

HELIACAL, in aſtronomy, a term applied to the riſing or ſetting of the ſtars, or, more ſtrictly ſpeaking, to their emerſion out of and immerſion into the rays and ſuperior ſplendor of the ſun.

A ſtar is ſaid to riſe heliacally, when, after being in conjunction with the ſun, and ſo inviſible, it gets at ſuch a diſtance as to be ſeen before the ſun riſe; and it ſets heliacally, when it approaches ſo near the ſun as to be hid by its rays: ſo that ſtrictly theſe are only an apparition and occultation.

The heliacal riſing of the moon happens when ſhe is ſeventy degrees diſtant from the ſun; for the other planets twenty degrees diſtance is required; and for the ſtars more or leſs, according to their magnitude.

To find by the globe the time of the year when any known ſtar or planet will riſe or ſet heliacally: rectify the globe, and bring the ſtar or planet to the eaſt part of the horizon; then ſee what degree of the ecliptic is elavated above the weſtern horizon, according to the reſpective arch of viſion: then the oppoſite degree on the horizon, ſo found, compared with the calendar, will ſhew you the day of its riſing; and for its ſetting bring the ſtar or planet to the weſt ſide of the horizon; obſerve to the eaſt what degree is elevated equal to the known arch of viſion; then, by the oppoſite degree, will be found the day of its ſetting.

HELIANTHEMUM, dwarf ciſtus, in botany,

a genus of plants, whoſe flower hath five roundiſh patent petals, with a number of erect ſtamina. The fruit is a roundiſh or oval capſule of one cell, opening with three valves, and filled with ſmall roundiſh ſeeds.

This genus is included among the ciſtuſes by Linnæus.

HELIANTHUS, the great ſun-flower, in botany, a genus of plants, whoſe flower is compound and radiated; on the diſc is placed a multitude of hermaphrodite cylindraceous florets; the rays are compoſed of a few very long, ſpearſhaped, ligulated, female ones; the ſtamina are five curved filaments, topped with cylindraceous antheræ; the ſeeds are ſolitary, oblong, tetragonal, and contained in the cup; the flowers are all yellow, and often more than a foot in diameter.

This genus is the ſame as the corona ſolis of other authors, and includes the Jeruſalem artichoke which is a ſpecies of it.

HELICE, in aſtronomy, is the ſame with urſa major. See URSA.

HELICTERES, the ſcrew-tree, in botany, a genus of plants, whoſe flower conſiſts of five oblong equal petals, which are affixed to the receptacle; the ſtamina are ten very ſhort filaments, topped with oblong antheræ. The fruit is compoſed of five unilocular capſules, ſpirally twiſted, and contains many angulated ſeeds.

HELIOCARPOS, in botany, a genus of plants, whoſe flower hath a tetraphyllous coloured perianthium, including four linear petals, conſiderably ſhorter and narrower than the cup; the ſtamina are twelve filaments, topped with twin incumbent antheræ. The fruit is a pedunculated bilocular capſule, of a turbinated oval figure, bordered with hairs reſembling rays, and the ſeed is oval and ſolitary.

HELIOCENTRIC *Place of a Planet*, that place or point in the ecliptic, wherein a planet would appear to a ſpectator placed in the center of the ſun.

The word is Greek, and compounded of ηλιος, the ſun, and κεντρον, a center.

The heliocentric place is the ſame with the longitude of a planet viewed from the ſun.

HELIOCENTRIC *Latitude of a Planet*, the latitude it would appear in at any time to a ſpectator placed in the ſun.

HELIOCOMETES, a phænomenon ſometimes obſerved about ſun-ſetting; being a large luminous tail, or column of light, proceeding from the body of the ſun, and dragging after it, not unlike the tail of a comet; whence the name.

HELIOSCOPE, in optics, a ſort of teleſcope, peculiarly adapted for obſerving the ſpots, eclipſes, &c. of the ſun.

The word is Greek, and compounded of ηλιος, the ſun, and σκοπεω, to view.

There are various apparatuſes of this kind: Dr. Hook recommends four reflecting glaſſes placed in the tube, whereby the force of the rays will be ſo weakened, as only to ſtrike the eye with a 256th part of their force; and this he prefers to all others.

M. Huygens only blackens the inſide of the eye-glaſs of the teleſcope, by holding it over the flame or ſmoke of a lamp, &c. or rather he blackens a piece of plain glaſs, and holds it between the eye and the object-glaſs; or, which is beſt of all, he claps the ſmoked glaſs to another, with a rim of thick paper between to keep the black from rubbing off, and fits the two into a frame, to be applied between the eye and the eye-glaſs. But the beſt method of viewing this luminary, is by the ſolar teleſcope. See *Solar* TELESCOPE.

HELIOSTATA, in optics, an ingenious inſtrument invented by the learned Dr. s'Graveſande; ſo called from its uſe, which is to fix, as it were, the rays of the ſun in a horizontal direction acroſs the dark chamber, all the while it is in uſe.

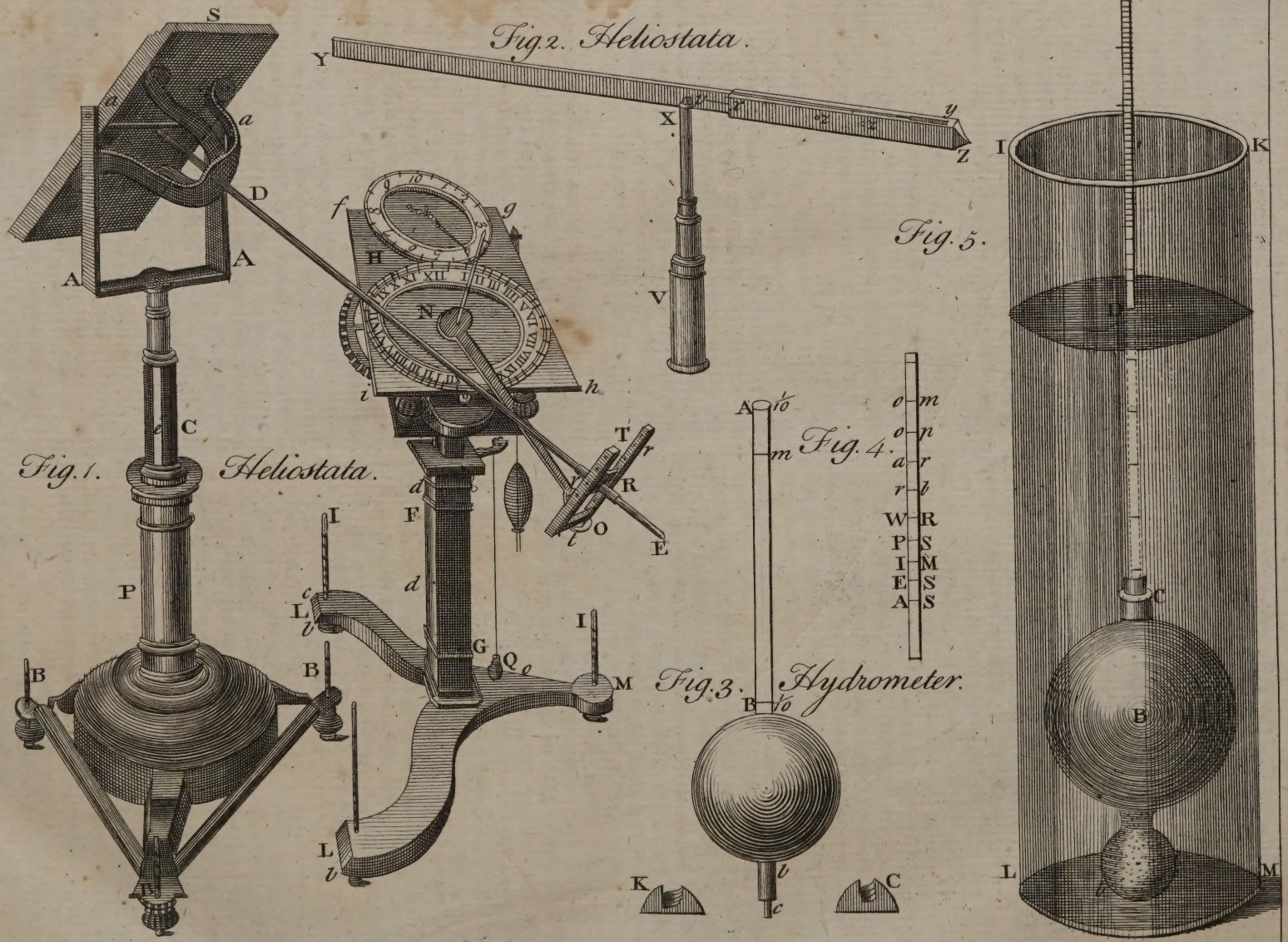
The word is formed from the Greek, ηλιος, the ſun, and ϛατιζω, to ſtop or fix.

This inſtrument is an automaton, or piece of clock-work, whoſe parts are as follow:

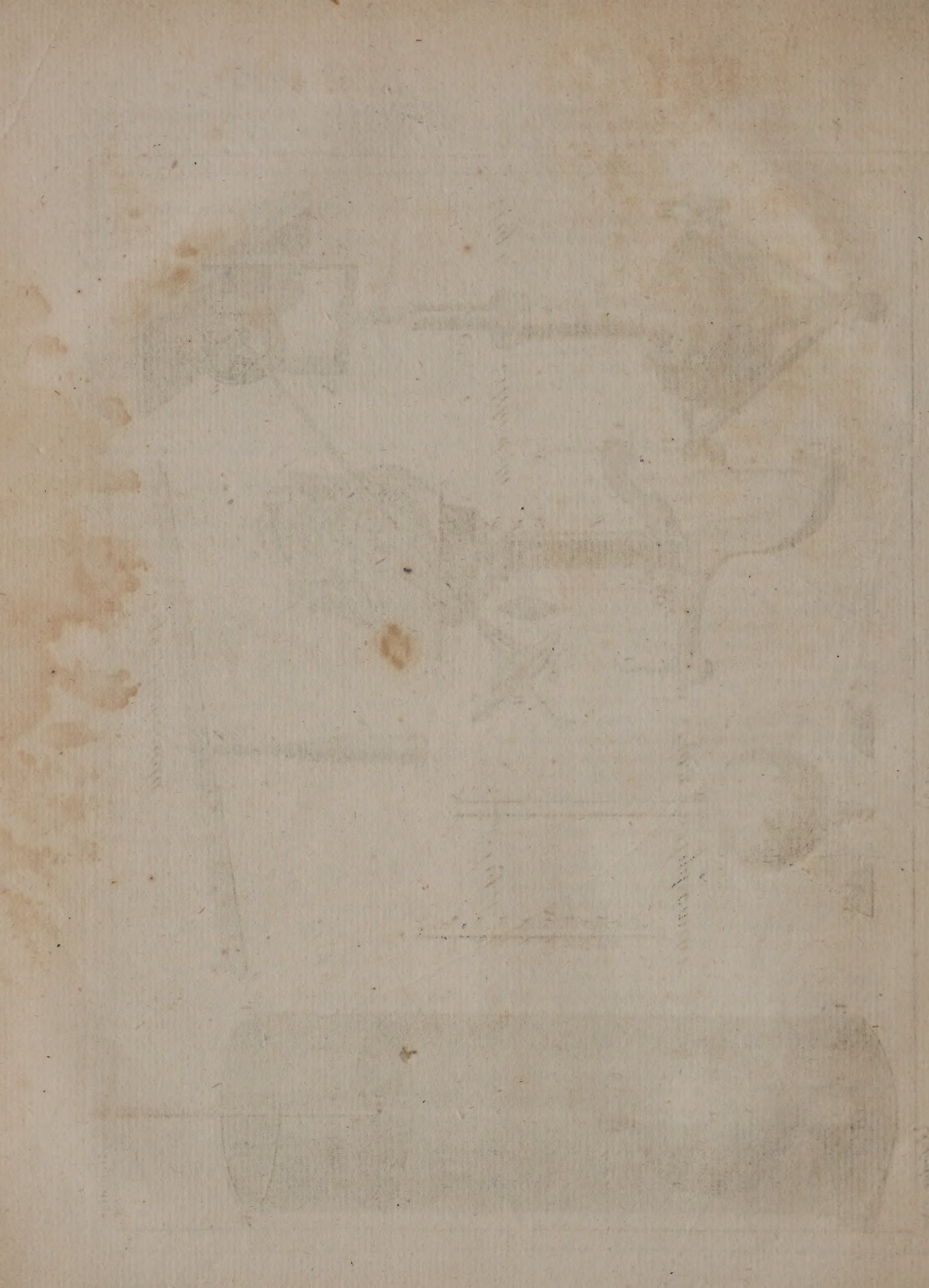
A A (plate LXI. *fig.* 1.) is a frame, about which a metalline ſpeculum S is ſuſpended, moveable about its axis, by means of two ſmall ſcrews *a*, *a*. This frame is fixed to the piece C, which being hollow is moveable upon the cylindric ſhaft P. This pillar is fixed on a triangular baſe or foot ſet perpendicularly, by the three ſcrews B, B, B.

On the back part of the ſpeculum is fixed a long cylindric wire, or tail D, in a perpendicular poſition. By this it is connected to the ſecond part of the helioſtata, which is a common thirty-four hour clock, repreſented at H; the plane of which clock is ſet parallel to that of the equator in any given place. This clock is ſuſtained on the column F G, in which it is moveable up and down by a thin lamina or plate that enters it as a caſe, and fixed to a proper height by two ſcrews *d*, *d*, at the ſide. The whole is truly adjuſted to a perpendicular ſituation by means of three ſcrews I, I, I, in the tripod L, L, M, and the plummet Q, whoſe capſis muſt anſwer to the point *o* beneath.

The axis of the wheel which moves the index N O, over the hour circle, is ſomewhat large, and perforated with a cylindric cavity approaching a little to a conical figure; and receives the ſhank of the ſaid index N O very cloſe and tight, that by its motion the index may be carried round. In the extremity O of the index is a ſmall cylindric piece, with a cylindric perforation to receive the tail *t* of the fork T, yet ſo as to admit a free motion therein. In each ſide of the fork are ſeveral holes exactly oppoſite to each other, in which go the ſcrews *r*, *r*, upon



J. Lodge sculp.



upon whoſe ſmooth cylindric ends moves the tabular piece R.

When the machine is to be fixed for uſe, another part is made uſe of to adjuſt it; which is called the poſitor, and is denoted by the letters V X Y Z, *fig.* 2.

The cylinder C is removed with a ſpeculum from the foot P, and the braſs column V X put on in its ſtead, and adheres more ſtrictly to the pin *e*, that it may keep its poſition while the machine is conſtituted.

On the top of the column, about X as a center, moves the lever Y Z, ſo that it may be any how inclined to the horizon, and keeps its poſition. The arm Y X may be of any length at pleaſure; but the arm X Z is of a peculiar conſtruction, and of a determinate length. To this arm, which extends no farther than *y*, is a ſliding piece Z *x*, ſharp pointed at Z. By this the arm X Z is determined to a given length, the piece Z *x* being fixed by the ſcrews z z. Upon this arm is drawn the ſhort line *vx*, by which it may be lengthened in the whole, and is $\frac{9}{100}$ of the whole lenth X Z, when ſhorteſt. The reaſon is, this arm is always to increaſe and decreaſe in proportion to the ſecant of the ſun's declination to the radius X Z, when ſhorteſt; but the radius is to the ſecant of 23° 30′, the ſun's greateſt declination, as 10000000 to 10904411, or as 100 to 109. Now the reaſon of this conſtruction of the arm X Z, is to find for any given day the diſtance of the center of the ſpeculum S from the top *l* of the ſtyle *l* N, which muſt ever be equal to the ſecant of the ſun's declination; for it muſt always be equal to the diſtance of the top of the ſaid ſtyle, *l*, from the center of the cylinder R in the fork T, and that is always equal to the ſaid ſecant of declination.

For ſince the ſtyle *l* N and the fork T are in a poſition parallel to each other, therefore the middle hole in the ſides of the fork being, as they muſt be, of the ſame height above the end of the index O, as in the height of the ſtyle N *l*, it is evident that on an equinoxial day the ſun's rays will paſs directly thro' the perforation of the piece R, if it be put in a poſition parallel to the plane of the ecliptic, or that of the clock; and alſo that the top of the ſhadow of the ſaid ſtyle will fall exactly on the ſaid hole.

In this caſe, the top of the ſtyle is at the leaſt diſtance from the central point of R, and therefore may be repreſented by radius; while in any other poſition above or below, the diſtance will increaſe in proportion to the ſecant of the angle which the rays make with this firſt or middle ray, that paſs by the top of the ſtyle, and through the hole R.

Now it may be demonſtrated, that on any day of the year, if the clock and its pedeſtal be ſo fixed that the line of XII be exactly in the meridian, and that the poſition of R in the fork be ſuch that the ſun's rays go directly through it, and the ſhadow of the ſtyle's top fall juſt upon the hole; moreover, if the diſtance of the center of the ſpeculum S from the top of the ſtyle *l* be made equal, by the poſitor, to the diſtance of the central point R therefrom; and, laſtly, the tail of the ſpeculum D E paſſing through R; then if the clock be put into motion, the index N O ſhall carry about the tail of the ſpeculum, in ſuch a manner, that at all times of that day, when the ſun can come upon the ſpeculum, it will reflect the rays conſtantly in one and the ſame poſition and direction all the time without variation.

The machine thus conſtituted, is placed in a box or caſe, and ſet in the window with one ſide open, expoſed to the ſun, and all the other parts cloſe; ſo that when the room is made dark, and the ſolar microſcope fixed to the fore-part of the box in which the helioſtata is placed, juſt againſt the center of the ſpeculum to receive the reflected horizontal beam, all the experiments of the darkened room are then performed as uſual.

This is a very ingenious conſtruction of a ſolar microſcope apparatus, but we fear too expenſive and troubleſome for common uſe. However, it is eaſy to ſee that this machine is capable of being greatly reduced; ſince it may be made to anſwer the end very well without a clock, and the ſpeculum may be glaſs inſtead of metal, and all fixed in one pedeſtal. See the article MICROSCOPE.

HELIOPTROPE, in natural hiſtory, a large bluiſh-green jaſper, with red variegations. See the article JASPER.

HELIOTROPIUM, turnſole, in botany, a genus of plants whoſe flower is monopetalous and ſaucer-ſhaped; the tube is the length of the cup; the limb is plane, divided lightly into five ſegments, and obtuſe: the ſmaller ſegments ſtand alternate and are acute; the larger are placed between: the mouth is cloſed by five prominent ſquamulæ, joined in the form of a ſtar, there is no pericarpium, the calyx remains unaltered, and contains four oval acuminated ſeeds.

A decoction of common turnſole purges phlegm and bile. It is good againſt the ſting of ſerpents: the leaves are ſaid to take away warts, ulcers, gangrenes, and ſcrophulous tumours.

HELIX, in geometry, the ſame with a ſpiral line.

The word is Greek, ελιξ, a wreath, or winding, and derived from ειλεω, or ελισσω, to environ.

HELIX, in architecture. Some diſtinguiſh between it and ſpiral. Daviler ſays a ſtaircaſe is helical, when the ſteps wind round a cylindrical newel; whereas the ſpiral winds round a cone, continually approaching nearer its axis. Helix alſo denotes, in architecture, the caulicules or little volutes under the flower of the Corinthian capital, called likewiſe urillæ.

HELIX, in anatomy, the external circle or border of the ear, in contradiſtinction to the inner

protuberance correſponding thereto, called the anthelix. See EAR.

HELL, *Gehenna*, *Tartara*, *Hades*, *Infernus*, &c. the place of divine puniſhment after death, in contradiſtinction to heaven. See the article HEAVEN.

As all religions have ſuppoſed a future ſtate of exiſtence after this life, ſo all have their hell or place of torment, in which the wicked are ſuppoſed to be puniſhed. The hell of the ancient heathens was divided into two manſions, the one called Elyſium, on the right hand, pleaſant and delightful, appointed for the ſouls of good men; and the other called Tartara, on the left, a region of miſery and torment, appointed for the wicked. The latter was only hell in the preſent reſtrained ſenſe of the word. See the article ELYSIUM.

HELLEBORUS, black hellebore, in botany, a genus of plants, whoſe flower is roſaceous, and conſiſts of five large roundiſh obtuſe petals, with a great number of capillary ſtamina. The fruit is compoſed of ſeveral bicarinate compreſſed capſules, containing a number of round ſeeds fixed to the ſurture.

The common ſort grows naturally in ſeveral parts of England; but the true black hellebore, or Chriſtmas flower, grows on the Alps and Apennine mountains; it is a low perennial plant, without any other ſtalk than the pedicles of the leaves and flowers; the leaves are divided, quite to the pedicle, into ſeven or eight ſmooth firm ſegments, indented about the middle to the extremity, and flowers with us in January.

Black hellebore root is compoſed of many thick fleſhy fibres, black without and white within, of an acrid bitteriſh taſte; the ſmell, while freſh, is exceeding ſtrong. This taken inwardly proves a cathartic, and is reckoned good in melancholic and atrabilarious diſorders; it is found particularly ſerviceable againſt obſtinate ſuppreſſions of the menſtrual purgations, in plethoric habits, and ſanguine conſtitutions, where chalybeates are ineffectual or injurious.

White HELLEBORE, in botany. See the article VERATRUM.

HELLENISM, a ſort of Græciſm; a phraſe peculiarly adapted to the genius of the Greek tongue.

Helleniſm is diſtinguiſhed from Græciſm; in that the former is not applied to authors who have wrote in Greek, but to thoſe who, writing in ſome other language, uſe terms peculiar to the Greek.

HELLENISTIC, or HELLENISTIC LANGUAGE, that ſpoken among the Helleniſts.

HELM, in the marine, an engine of wood hung on the outſide of a ſhip behind, upon certain googings bolted to the ſtern-poſt, upon which it revolves, and by its motion directs the courſe of the ſhip at ſea.

The helm is compoſed of two or three parts, viz. the rudder, the tiller, and the wheel; this laſt part however is ſeldom uſed but in men of war, and the largeſt merchant-ſhips.

The rudder is that part of the helm which is hung on the outſide of the ſtern-poſt, as before deſcribed: in the top of the rudder there is a mortice cut, into which is firmly bolted the tiller, which is a piece of timber thruſt into the rudder to turn it; and, laſtly, the wheel is employed to move the tiller with greater facility from one ſide to the other, in directing a ſhip.

HELMET, an ancient defenſive armour worn by horſemen, both in war and in tournaments. It covered both the head and face, only leaving an aperture in the front ſecured by bars, which was called the viſor.

HELONIAS, in botany, a genus of plants, whoſe flower conſiſts of ſix oblong equal petals, with the ſame number of ſtamina. The fruit is a roundiſh capſule, having three cells, each containing a roundiſh ſeed.

HELVE, a term uſed among country people for the handle of a hatchet, pick-ax, mattock, or the like.

HEMEROCALLIS, day lilly, in botany, a genus of plants, whoſe flower conſiſts of an infundibuliform-campanulated corolla; the tube is ſhort, the limb patent, and divided into ſix reflexed ſegments. The fruit is an oval three-cornered capſule, containing three cells, which are filled with roundiſh ſeeds.

This genus includes the lilio-aſphodelus of Tournefort.

HEMERODROMI, in Grecian antiquity, centinels and guards appointed for the ſecurity and preſervation of cities and other places.

HEMICRANIA, in medicine, a ſpecies of headach, wherein only one half or ſide of the head is affected.

HEMICYCLE, in architecture, is defined by Daviler to be an arch forming a perfect ſemicircle. See the articles ARCH and BRIDGE.

To conſtruct ſuch an arch of hewn ſtone, they divide hemicycle into a certain number of equal parts, and faſhion an equal number of vouſoirs, which will complete the arch: however, that there may be no joint in the middle, where the key-ſtone ſhould be, they always take care that the number of vouſoirs be an odd one.

HEMICYCLIUM, in antiquity, a part of the orcheſtra in the ancient theatres.

HEMICYCLIUM alſo ſignified a kind of ſun-dial; being a concave ſemicircle, the upper cuſp of which looked to the north. On the middle of the hemicyclium ſtood a ſtyle, whereof the point that correſponded to the center of the hemicycle, repreſented the center of the earth; and its ſhadow, being

ing projected on the concavity of the hemicycle, which represented the space between the two tropics, pointed out not only the declination of the sun, and the day of the month, but likewise the hour of the day.

HEMINA, in Roman antiquity, a liquid measure, which, according to Arbuthnot, was equal to half a wine-pint English measure; its contents being 2,818 solid inches. See the article MEASURE.

HEMIONITIS, mules fern, in botany, a genus of plants, of which there are several species; the fructifications of this genus are arranged into lines, sometimes branched, often uniting and intersecting one another.

HEMISPHERE, *Hæmisphærium*, in geometry, the half of a globe or sphere, when divided into two by a plane passing through its center.

The word is Greek, and compounded of ἡμισυς, half, and σφαιρα, a sphere.

The center of gravity of a hemisphere is $\frac{5}{8}$ of the radius distant from the vertex. It is proved in optics, that a glass hemisphere unites the parallel rays at the distance of a diameter and one third of a diameter from the pole of a glass.

HEMISPHERE, in astronomy, particularly denotes one half of the mundane sphere. The equator divides the sphere into two equal parts, called the northern and southern hemispheres, having the north and south poles in their respective zeniths. The horizon also divides the sphere into two hemisphere, the upper and lower, having the zenith and nadir in their respective vertices.

HEMISPHERE also denotes a projection of half the terrestrial globe, or half the celestial sphere on a plane, and is frequently called planisphere.

HEMISPHEROIDAL, in geometry, an appellation given to whatever approaches to the figure of an hemisphere, but is not exactly so.

HEMISTICH, ἡμιστιχος, in poetry, denotes half a verse, or a verse not compleated.

In reading common English verses, a short pause is required at the end of each hemistich, or half verse.

HEMITONE, in the ancient music, what we now call a half note or semitone.

HEMITRITÆUS, in medicine, a kind of fever, denoting the same as semi-tertian, returning twice every day.

The word is Greek, and compounded of ἡμισυς, half, and τριταιος, third or tertian.

HEMLOCK. See CONIUM.

Water HEMLOCK. See CICUTA.

HEMP, *Cannabis*, in botany, a very useful plant for making cordage, and all things of that kind.

The stalks of hemp grow to be five or six feet high, angular, and covered with a strong tough bark; and cloathed with many digitated leaves, each composed of five, six, or seven parts, long and narrow, sharp-pointed and serrated about the edges, the middlemost being longest, set together upon one foot-stalk; they are green above and hoary underneath, and rough in handling. The flowers, in that they call the male, grow towards the top of the stalk in bunches, small and staminous, which perish without bringing any seed, which is produced by the female without any previous flowers.

Hemp is an useful plant, purchased at a dear rate from foreigners, when it might be cultivated among ourselves, to the great benefit of the nation in general. It delights in warm, sandy, or somewhat gravelly soil; but it must be somewhat rich and of a good depth. The best seed is that which is brightest, and retains its colour and substance in rubbing. Three bushels will sow an acre; but the richer the land is, the thicker it must be sown, and the poorer it is, the thinner. The time of sowing it, is from the latter end of March, to the end of April, according as the spring falls out; but the earlier it is sown the better. If it be a dry season, great care must be taken to preserve it from birds.

The first season for gathering it is about Lammas, when a good part of it will be ripe; that is, the light summer hemp which bears no seed, and is called fimble-hemp. When it is ripe, the stalks grow white, and the leaves fall downwards, turning yellow at the top; it must then be pulled up, dried, bound up in bundles as big as may be grasped in both hands, and laid by for use. Care must be taken not to break what is left standing, because it is to grow till near Michaelmas before it will be fit to gather: this is usually called karle-hemp. When it is gathered, lay it in the sun three or four days to dry, and then stack or house it till the seed be threshed out.

An acre of hemp, in the best land, commonly yields about two or three quarters of seed, which, with the hemp unwrought, is often worth from 5 to 8 l. but if wrought, from 10 to 12 l. but the fimble-hemp is not worth above half as much as the other.

As to the method of preparing it, after the seeds are threshed out of the heads, and the stalks are laid up in bundles, and steeped in a standing water, the cleaner it is the better; they are fastened to poles, and left to soak about fifteen days; and when the substance of the stalk is almost rotten, the bundles are taken out and well dried. But flax, instead of being steeped in water, is usually exposed alternately to the moist air of the night, and the heat of the sun, by which means it receives a finer colour.

When hemp and flax are well penetrated and afterwards completely dried, they are bruised by handfuls on a block, with a kind of mallet; all the bullen, which is the inward substance of the stem, flies off in shivers, by the force of the blows, and nothing remains in the hands of the beater but the

thin bark in large threads, through the whole length of the ſtem. This parcel of threads is afterwards hung on a perpendicular board, and bruiſed with a wooden beetle, in order to ſhake out all the little ſtraws that may happen to remain of the bullen. All the groſs parts are now ſeparated from the ſtem, and the threads of the bark receive their perfection from the comb or hatchel. See the article HATCHEL.

The refuſe of this combing, which conſiſts of all the threads which are too thick, is called tow, for the uſe of which ſee the article TOW.

HEN, *Gallina*, in ornithology, though uſed in a general ſenſe to ſignify any female bird, is more particularly reſtrained to thoſe of the order of gallinæ.

HEN-BANE, a plant called by botaniſts hyoſciamus. See HYOSCIAMUS.

HEN-MOULD, among farmers, denotes a black ſpungy ſoil, fitter for grazing than for corn.

In ſome places, indeed, they give the name of hen-mould to a rich black earth mixed with whitiſh ſtreaks, which is exceeding fertile.

HENTING, among farmers, a method of ſowing immediately before the plough, by which, it is pretended, a great deal of charge is ſaved. See PLOWING.

HENTING FURROWS, thoſe turned from each other at the bottom, in plowing ridges. See the article PLOWING.

HEPAR, the liver, in anatomy. See LIVER.

HEPATIC, in medicine and anatomy, any thing belonging to the liver.

HEPATIC ALOES. See ALOES.

HEPATIC VEIN. See BASILICA.

HEPATICA, noble liverwort, in botany, a low plant, without any other ſtalk than the pedicles of the leaves and flower; the leaf is cut, not very deep, into three lobes, entire about the edges; the flower is commonly blue, ſometimes reddiſh or white, hexapetalous, ſet in a three-leaved cup, with numerous ſtamina in the middle, which are followed by a cluſter of whitiſh ſeeds. It is perennial, grows wild on gravelly ſhady grounds in Germany and other parts of Europe, and flowers in our gardens in March or ſooner.

This herb is a mild reſtringent and corroborant; in which intentions, infuſions of it have been drank as tea, or the powder of the dry leaves given to the quantity of half a ſpoonful at a time.

HEPATICA, liverwort, in botany, a ſpecies of moſs, conſiſting of numerous obtuſely laciniated leaves, lying over one another, marked on the ſurface with white tubercles reticularly diſpoſed through the green ſubſtance of the leaf, ſhooting out underneath fine capillary roots: from the extremities of the leaves iſſue clear whitiſh pedicles, bearing globular bodies, which when ripe contain black minute ſeeds like duſt. It is perennial, grows on moiſt ſtony places, and runs up to ſeed in March or April.

This moſs is recommended as an aperient, reſolvent, and purifier of the blood. From the penetrating though mild pungency and bitteriſhneſs of its taſte, ſinking as it were into the tongue, it promiſes to be a plant of no inconſiderable virtue, tho' in this country at preſent diſregarded.

HEPATITIS, in medicine, an inflammation of the liver, with an impoſthume of that organ. It bears a near reſemblance to the pleuriſy, only its ſymptoms are not ſo intenſe. It commonly either kills the patient or ſuppurates gradually, or degenerates into a ſchirrhus.

HEPHÆSTIA, in Grecian antiquity, an Athenian feſtival in honour of Vulcan, the chief ceremony of which was a race with torches.

HEPTACHORD, in the ancient poetry, ſignified verſes that were ſung or played on ſeven chords, that is, on ſeven different notes. In this ſenſe it was applied to the lyre, when it had but ſeven ſtrings.

HEPTAGON, in geometry, a figure conſiſting of ſeven ſides and as many angles.

The word is Greek, and compounded of ἑπτα, ſeven, and γωνια, an angle.

If the ſides be all equal, it is called a regular heptagon.

HEPTAGONAL NUMBERS, are a ſort of polygonal numbers, wherein the difference of the terms of the correſponding arithmetical progreſſion is 5.

One of the properties of theſe numbers is, that if they be multiplied by 40, and 9 be added to the product, the ſum is a ſquare number.

HEPTAMERIS, in muſic, the ſeventh part of a meris, being, according to M. Sauveur, the forty-third part of the octave, See the article OCTAVE.

HEPTANDRIA, from ἑπτα, ſeven, and ανηρ, male, the name of the ſeventh claſs in the Linnæan ſyſtem of botany, comprehending thoſe plants whoſe flowers are hermaphrodite, and furniſhed with ſeven ſtamina, or male parts, in each.

Of this claſs are the horſe-cheſnut, trientalis, &c.

HEPTANGULAR, in geometry, an appellation given to figures which have ſeven angles.

HEPTARCHY, a government conſiſting of ſeven perſons, or a country divided into ſeven kingdoms.

The word is Greek, and formed of ἑπτα, ſeven, and αρχη, rule.

The Saxon heptarchy included the ſouthern and northern parts of England, which was cantoned into ſeven petty kindoms, as thoſe of Kent, South-Saxons, Weſt-Saxons, Eaſt-Saxons, Northumberland, the Eaſt-Angles, and Mercia. The heptarchy was formed by degrees from the year 457, when the kingdom of Kent was firſt erected, and terminated

nated in 805, when king Egbert re-united them into a monarchy.

HEPTATEUCH, in literature, a volume conſiſting of ſeven books.

The word is Greek, and compounded of ἑπτὰ, ſeven, and τεῦχος, a book or work.

Heptateuch chiefly denotes the five books of Moſes, called the Pentateuch, together with the two following books, Joſhua and Judges.

HERACLEONITES, a ſect of Chriſtians, the followers of Heracleon, who refined upon the Gnoſtic divinity, and maintained that the world was not the immediate production of the Son of God, but that he was only the occaſional cauſe of its being created by the Demiurgus. The Heracleonites denied the authority of the prophecies of the Old Teſtament, maintaining that they were mere random ſounds in the air; and that St. John the Baptiſt was the only true voice that directed to the Meſſiah.

HERACLEUM, cow-parſnip, in botany, a genus of umbelliferous plants, the general flower of which is difform and radiated; the ſingle flowers of the diſc conſiſt each of five equal petals, but thoſe of the radius conſiſt of five unequal petals. The fruit is elliptic, compreſſed, and ſtriated on each ſide, in the middle, and contains two oval compreſſed ſeeds.

The genus includes the ſphondylium of Tournefort.

HERACLIDÆ, or *Return of the* HERACLIDÆ *into Peloponneſus*, in chronology, a famous epocha, that conſtitutes the beginning of profane hiſtory; all the time preceding that period being accounted fabulous.

This return happened in the year of the world 2862, an hundred years after they were expelled, and eighty after the deſtruction of Troy.

HERALD, an officer at arms, whoſe buſineſs it is to deciare war, to proclaim peace, to marſhal all the ſolemnities at the coronation, chriſtening, marriage, and funeral of princes, to blazon and examine coats of arms, &c.

The three chief heralds are called King's at Arms, the principal of which is Garter; the next is called Clarencieux, and the third Norroy; theſe two laſt are called provincial heralds.

Beſides theſe, there are ſix other inferior heralds, viz. York, Lancaſter, Somerſet, Richmond, Cheſter, and Windſor; to which, on the coming of king George I. to the crown, a new herald was added, ſtyled Hanover herald; and another, ſtyled Gloceſter king at arms.

The kings at arms, the heralds, and four purſuivants, are a college or corporation, erected by a charter granted by Richard III. by which they obtained ſeveral privileges, as to be free from ſubſidies, tolls, and all troubleſome offices.

HERALDRY, the art of armoury and blazoning, which comprehends the knowledge of what relates to ſolemn cavalcades and ceremonies at coronations, inſtalments, the creation of peers, nuptials, funerals, &c. and alſo whatever relates to the bearing of arms, aſſigning thoſe that belong to all perſons, regulating their right and precedencies in point of honour, and reſtraining thoſe who have not a juſt claim from bearing coats of arms that do not belong to them. See BLAZONING, ARMS, SHIELD, BEARING, &c.

HERB, a denomination common to all plants, whoſe ſtalks die every year, after their ſeed is ripe.

The word is derived from the Latin *herba*, which ſignifies the ſame thing.

There are ſome herbs whoſe root periſhes with the ſtem, and others where the root ſurvives the ſtem by ſeveral years. The former are called annuals: thoſe which only bear flowers and fruit the ſecond year, or even the third, and then periſh, are called biſannuals. Herbs whoſe roots do not periſh after they have ſhed their ſeed, are called perannuals, and, if they keep their leaves all the year round, they are called ever-greens. Herbs are alſo diſtinguiſhed into kitchen, ſallad, and medicinal herbs.

HERB-CHRISTOPHER. See ACTOEA.

HERBAGE, in law, ſignifies the paſture provided by nature for the food of cattle; alſo the liberty to feed cattle in the foreſt, or in another perſon's ground.

HERBAL, in literary hiſtory, a book that treats of the claſſes, genera, ſpecies, and virtues of plants.

HERBAL is ſometimes uſed alſo for what is more uſually called hortus ſiccus.

HERBALIST, the author of an herbal, or one who is ſkilled in plants.

HERBIVOROUS ANIMALS, thoſe which feed only on vegetables.

HERCULES, in aſtronomy, one of the conſtellations in the northern hemiſphere. See the article CONSTELLATION.

HERD, a company of eatable cattle of the larger ſort, as cows, oxen, ſwine, deer, &c. alſo of wild beaſts.

HEREDITAMENTS, whatever immoveable things a perſon may have to himſelf and his heirs, by way of inheritance; and which, if not otherwiſe bequeathed, deſcend to him who is next heir, and not to the executor, as chattels do.

This word extends to whatever is inheritable, be it real, perſonal, or mixed; and in conveyances, by the grant of hereditaments, manors, houſes, lands, rents, &c. will paſs.

HEREDITARY, an appellation given to whatever belongs to a family by right of ſucceſſion, from heir to heir.

HERESY, the crime of obſtinately perſiſting in opinions that are contrary to the fundamentals of religion.

HERETIC, a general name for all ſuch perſons under

under any religion, but eſpecially the Chriſtian, as profeſs or teach religious opinions contrary to the eſtabliſhed faith, or to what is made the ſtandard of orthodoxy.

HERISSON, in fortification, a beam armed with a great number of iron ſpikes, with their points outwards, and ſupported by a pivot, on which it turns.

Theſe ſerve as a barrier to block up any paſſage, and are frequently placed before the gates, and more eſpecially the wicket doors of a town or fortreſs, to ſecure thoſe paſſages, which muſt of neceſſity be often opened and ſhut.

HERMANNIA, in botany, a genus of plants whoſe flower is pentapetalous and twiſt againſt the ſun; the ſtamina are five broad filaments, topped with erect acuminated antheræ. The fruit is a roundiſh pentagonal capſule, with five cells, containing a number of ſmall ſeeds.

HERMAPHRODITE, one who partakes of both ſexes.

The word is Greek, Ερμαφροδιτος, and compounded of Ερμης, Mercury, and Αφροδιτη, Venus, as being a mixture of Mercury and Venus, that is, of male and female.

Moſt, if not all thoſe reported to be hermaphrodites, are probably no other than mere women, whoſe clitoris is grown to an exorbitant ſize, and whoſe labia pudendorum are become preternaturally tumid.

Among the inſect claſs of animals, indeed, hermaphrodites are very frequent: ſuch are worms, ſnails, leeches, &c.

HERMAPHRODITE FLOWERS, among botaniſts, are thoſe which contain both the male and female organs of generation; theſe are by far the moſt numerous.

HERMATHENA, among antiquarians, a ſtatue repreſenting Mercury and Minerva both in one.

HERMETIC, or HERMETICAL, an appellation given to whatever belongs to chemiſtry, from Hermes Triſmegiſtus, who is ſuppoſed to have been its inventor.

HERMETICAL PHILOSOPHY, that which undertakes to ſolve all the phænomena of nature from the three chemical principles, ſalt, ſulphur, and mercury. A conſiderable addition was made to the ancient hermetical philoſophy by the modern doctrine of alkali and acid. See ALKALI.

HERMETICAL PHYSIC, the art of healing, as founded on the hermetical philoſophy.

HERMETICAL SEAL, a method of ſtopping glaſs-veſſels for chemical operations ſo very accurately, that nothing can eſcape. It is done by heating the neck of the veſſel in the flame of a lamp, till it be ready to melt, and then twiſting it cloſe together with a pair of pincers.

Veſſels may likewiſe be ſealed hermetically, by ſtopping them with a plug of glaſs well luted into the neck of the veſſel; or by inverting another ovum philoſophicum over that wherein the matter is contained.

HERMIT, a devout perſon retired into ſolitude to be more at leiſure for prayer and contemplation.

The word is derived from the Greek, ερημος, a wilderneſs.

HERMODACTYL, in pharmacy, the root of an unknown plant, brought from Turky, of the ſhape of a heart flatted; of a white colour; compact and ſolid, yet eaſy to cut or powder. It is not now known in practice.

HERNANDIA, in botany, a genus of plants producing male and female flowers on the ſame plant; the corolla of the male as well as the female is divided into ſix ſegments; when the flower is decayed, the cup becomes a large inflated oblong fruit, perforated at each end, containing a hard globoſe nut lightly depreſſed.

We know only one ſpecies of this genus, which is the hernandia, with a large umbilicated ivy-like leaf, commonly called, in the Weſt-Indies, Jack in a box.

HERNIA, in medicine, a tumor formed by the deſcent of the inteſtines or omentum out of their place: it is popularly called a rupture.

HERNIARIA, rupture-wort, in botany, a genus of plants whoſe flower is apetalous, but conſiſts of a monophyllous-coloured cup cut into five ſpreading ſegments, and is perſiſtent. The fruit is a ſmall capſule placed in the bottom of the cup, and contains a ſmooth oval pointed ſeed.

A ſpecies of this genus, called herniaria glabra or ſmooth rupture-wort (which grows naturally in ſome parts of England) is recommended by Schroder in a diabetes: he ſays, it helps to diſſolve the ſtone, and abſterges the mucus from the ſtomach and other parts; but its chief uſe is in plaiſters and ointments, to be applied outwardly againſt ruptures.

HERO, in the ancient mythology, a great and illuſtrious perſon, of a mortal nature, though ſuppoſed by the populace to partake of immortality; and, after his death, placed among the number of the gods.

Heroes were perſons partly of divine and partly of human extraction, being begot between a deity and a mortal, and coincides with what we otherwiſe call a demi-god; ſuch was Hercules, who was the ſon of Jupiter by Alcmena: accordingly Lucian deſcribes a hero to be a medium between a god and man, or rather a compoſition of both.

HERO is alſo uſed in a more extenſive ſenſe for a great, illuſtrious, and extraordinary perſonage; particularly in reſpect of valour, courage, intrepidity, and other military virtues.

HERO *of a Poem, or Romance*, is the principal perſonage, or character therein. See the article CHARACTER.

The hero of the Iliad is Achilles; of the Odyſſe, Ulyſſes; of the Æneid, Æneas; of Taſſo's Jeruſalem,

ſalem, Godfrey of Bulloign; of Milton's Paradiſe Loſt, the Meſſiah; though Mr. Dryden will have the Devil to be Milton's hero, in regard he gets the better of Adam, and drives him out of Paradiſe.

HEROIC, ſomething belonging to a hero, or heroine: thus,

HEROIC AGE, that age or period of the world wherein the heroes are ſuppoſed to have lived. The heroic age coincides with the epic poem. See EPIC.

HEROIC VERSE, that wherein heroic poems are uſually compoſed; or it is that proper for ſuch poems. In the Greek and Latin, hexameter verſes are uſually denominated heroic verſes, as being alone uſed by Homer, Virgil, &c. See the article HEXAMETER.

Alexandrine verſes of twelve ſyllables were formerly called heroic verſes; but latter writers uſe verſes of ten ſyllables.

HEROINE, a woman of an heroic ſpirit, or who makes the principal perſonage in an heroic poem. See HERO and POEM.

HERON, in ornithology, a bird of the ardea-kind, with a hanging creſt.

HERPES, in medicine, a bilious puſtule, which breaking out in different manners upon the ſkin, accordingly receives different denominations.

If they appear ſingle, as they frequently do in the face, the baſe is inflamed, and the top pointed; and having diſcharged a drop of matter, the redneſs and pain go off, and they dry away. There is another ſort more corroſive and of greater malignity, when a cluſter of puſtules riſe in a ring, accompanied with ſmart, and ſometimes with great itching; this ſpecies is termed ſerpigo, and vulgarly the tetter or ring-worm.

Another kind of this diſeaſe appears in large cluſters upon the neck, breaſt, loins, &c. attended with a ſlight fever and inflammation. The heads are white and mattery, which are ſucceeded by a ſmall round ſcab reſembling millet ſeed, whence its name, and vulgarly called ſhingles. See the article ERYSIPELAS.

HERRING, in ichthyology, a ſpecies of clupea, with the lower jaw longeſt, and without any black ſpots. It is from five to eight inches in length, and between one and two in breadth.

HERRING *Fiſhery*. Herrings are chiefly found in the North ſea. They are a fiſh of paſſage, and commonly go in ſhoals, being very fond of following fire or light, and in their paſſage they reſemble a kind of lightning. About the beginning of June, an incredible ſhoal of herrings, probably much larger than the land of Great-Britain and Ireland, come from the north on the ſurface of the ſea; their approach is known by the hovering of a ſea fowl in expectation of prey, and by the ſmoothneſs of the water; but where they breed, or what particular place they come from, cannot be eaſily diſcovered. As this great ſhoal paſſes between the ſhores of Greenland and the north cape, it is probably confined, and as it reaches the extremities of Great-Britain, is neceſſarily divided into two parts. For we find one part of the herrings ſteering weſt, or ſouth-weſt, and leaving the iſlands of Shetland and Orkney to the left, paſs on towards Ireland, where being interrupted a ſecond time, ſome keeping the ſhore of Britain, paſs away ſouth down St. George's channel; while the other part, edging off to the ſouth-weſt, coaſt the weſtern ocean, till they reach the ſouth ſhore of Ireland, and then ſteering ſouth-weſt, join the reſt in St. George's channel. The other part of the firſt diviſion made in the north, parting a little to the eaſt and ſouth-eaſt, paſs by Shetland, and then make the point of Buchan-neſs, and the coaſt of Aberdeen, filling as they go, all the bays, firths, creeks, &c. with their innumerable multitudes. Hence they proceed forward, paſs by Dunbar, and rounding the high ſhores of St. Abbe's Head, and Berwick, are ſeen again off Scarborough; and even then not diminiſhed in bulk, till they come to Yarmouth roads, and from thence to the mouth of the Thames, after which, paſſing down the Britiſh Channel, they ſeem to be loſt in the Weſtern ocean.

There is nothing particular in the manner of fiſhing. The nets wherein the fiſh are drawn, ſhould regularly have their meſhes an inch ſquare to let all the leſſer fry go through.

Curing and preparing HERRING. The commerce of herring, both white or pickled, and red, is very conſiderable. The white Dutch herrings are the moſt eſteemed, being diſtinguiſhed into four ſorts, according to their ſizes; and the beſt are thoſe that are fat, fleſhy, firm, and white, ſalted the ſame day they are taken with good ſalt, and well barrelled. The Britiſh herrings are little inferior, if not equal to the Dutch; for in ſpite of all their endeavours to conceal the ſecret, their method of curing, laſting, or caſking the herrings, has been diſcovered, and is as follows. After they have hauled in their nets, which they drag in the ſterns of their veſſels backwards and forwards in traverſing the coaſt, they throw them upon the ſhip's deck, which is cleared of every thing for that purpoſe: the crew is ſeparated into ſundry diviſions, and each diviſion has a peculiar taſk: one part opens and guts the herrings, leaving the melts and roes; another cures and ſalts them, by lining or rubbing their inſide with ſalt; the next packs them, and between each row and diviſion they ſprinkle handfuls of ſalt; laſtly, the cooper puts the finiſhing hand to all, by heading the caſks very tight, and ſtowing them in the hold. It is cuſtomary with us to waſh the herrings in freſh water, and ſteep them twelve or fifteen hours, in a ſtrong brine, before we proceed to barrel them.

Red HERRINGS muſt lie twenty-four hours in the brine, inaſmuch as they are to take all their ſalt there, and when they are taken out they are ſpitted, that is, ſtrung by the head on little wooden ſpits, and

and then hung in a chimney made for that purpose: after which, a fire of brush-wood, which yields a deal of smoke, but no flame, being made under them, they remain there till sufficiently smoked and dried, and are afterwards barrelled up for keeping.

HERSE, in fortification, is a lattice or portcullice, made in the form of a harrow, and stuck full of iron spike.

It is usually hung by a rope, fastened to a moulinet, which is cut in case of a surprize, or when the the first gate is broken with a petard, to the end that it may fall and stop up the passage of the gate, or other entrance of a fortress.

These herses are also often laid in the roads, with the points upwards, to incommode the march both of the horse and infantry.

HERSILLON, in the military art, a sort of beam, &c. between ten and twelve feet long, whose two sides are full of spikes, to incommode both horse and foot.

The word is a diminitive of the preceding.

HESPER, *Hesperus*, in astronomy, the evening star, Venus being so called when she sets after the sun.

The word is Greek, Εσπερος, the brother of Atlas, and father of the Hesperides.

HESPERIDES, in the ancient mythology, were the daughters of Hesperus, which were three in number, Ægle, Arethusa, and Hesperethusa. They are represented by the ancients as having the keeping of certain golden apples on the other side the ocean. The poets assign them a dragon to watch the fruit: this dragon Hercules slew, and carried off the apples.

HESPERIS, dame's violet, in botany, a genus of plants, whose flower is tetrapetalous and cruciform; the stamina are six subulated filaments (two of which are shorter than the rest) these are topped with linear erect antheræ. The fruit is a plain oblong compressed bilocular pod, with two valves, containing many ovated compressed seeds.

HETEROCLITE, among grammarians, one of the three variations in irregular nouns, and defined by Mr. Ruddiman a noun that varies in declension; as *hoc vas, vasis*; *hæc vasa, vasorum*.

Other grammarians take the word heteroclite in a larger sense, applying it to all irregular nouns.

HETERODOX, in polemical theology, any thing contrary to the faith and doctrines of a true church.

HETERODROMUS VECTIS, in mechanics, a lever, wherein the fulcrum, or point of suspension, is placed between the power and the weight. See the article LEVER.

HETEROGENEOUS, or HETEROGENEAL, something that consists of parts of diffimilar kinds, in opposition to homogeneous. See HOMOGENEOUS.

HETEROGENEOUS, in mechanics, such bodies whose density is unequal in different parts of their bulk; or they are such whose gravities in different parts are not proportionable to the bulks thereof: whereas bodies equally dense or solid in every part, or whose gravity is proportionable to their bulk, are said to be homogeneous.

HETEROGENEOUS LIGHT is, by Sir Isaac Newton, said to be that which consists of rays of different degrees of refrangibility: thus the common light of the sun or clouds is heterogeneous; being a mixture of all sorts of rays.

HETEROGENEOUS NOUNS, one of the three variations in irregular nouns; or such as are of one gender in the singular number, and of another in the plural.

HETEROGENEOUS QUANTITIES are those which are of such different kinds, as that one of them taken any number of times, never equals or excels the other.

HETEROGENEOUS SURDS are such as have different radical signs, as $\sqrt[3]{a}\,a$, $\sqrt[4]{b}\,b$, $\sqrt{9}$, $\sqrt{18}$, &c. See SURD.

HETEROSCII, in geography, commonly denotes those inhabitants of the earth in the temperate zones, whose shadow at noon is always projected the same way, either northward or southward.

The word is Greek, and compounded of ετερος, different, and σκια, a shadow.

Heteroscii however, strictly denotes those inhabitants which, during the whole year, have their noon-tide shadows projected different ways from each other. Thus the inhabitants of the northern temperate zone are heteroscii with regard to those of the southern. The inhabitants of one part of the torrid zone are heteroscii with regard to those of the rest, and to those of one of the temperate zones, except at the solstices; and even at that time, all of the torrid zone are heteroscii with regard to those of the temperate zones: but as the people of the torrid zone have their shadow now on this, and then on that side, they are called amphiscii. See AMPHISCII.

HETEROUSIANS, a name composed of ετερος other, and ουσια, substance; being given to a sect of Arians, who did not believe that the Son of God was of a substance like to that of the Father, which was the opinion of another branch of the Arians, who were from thence called Hemoousians; but that he was of another substance, different from that of the Father.

HEUCHERA, in botany, a plant which produces many cordated leaves of a lucid green, and crenated on their edges; from between these ariseth the foot stalks of the flower, about a foot high, dividing at the top into a loose panicle, sustaining many quinquepetalous flowers of a dull purple-colour, which afterwards turns each to an ovate acuminated capsule, with two reflexed horns, and two cells filled with many small seeds.

HEXACHORD, in ancient muſic, a concord called by the moderns a ſixth.

HEXAEDRON, *Hexahedron*, in geometry, one of the Platonic or five regular bodies, being a ſolid conſiſting of ſix equal ſides or faces, popularly called a cube.

The ſquare of the ſide of a hexaedron is in a ſubtriple ratio to the ſquare of the diameter of the circumſcribed ſphere. Hence the ſide of the hexaedron is to the ſide of the ſphere it is inſcribed in, as 1 to $\sqrt{3}$, and conſequently incommenſurable thereto.

HEXAGON, in geometry, a figure of ſix ſides, and as many angles.

If the ſides and angles be equal, it is called a regular hexagon. The ſide of a regular hexagon inſcribed in a circle is equal to the radius of that circle; hence a regular hexagon is inſcribed in a circle, by ſetting the radius off ſix times upon the periphery: As 1 to 1.672, ſo is the ſquare of the ſide of any regular hexagon to the area thereof nearly.

To deſcribe a hexagon on a given line A B (plate LX. *fig.* 2.) draw an equilateral triangle A B C, and the vertex C will be the center of a circle, which will circumſcribe the hexagon required.

HEXAMETER, in the Greek and Latin poetry, a verſe conſiſting of ſix feet.

The firſt four feet of a hexameter may be either dactyls or ſpondees; but the laſt foot ſhould in ſtrictneſs be a ſpondee, and the laſt but one a dactyl, as in Homer and Virgil.

HEXANDRIA, from εξ, ſix, and ανηρ, male, the name of the ſixth claſs in the Linnæan ſyſtem of botany, including all thoſe plants whoſe flowers are hermaphrodite, and furniſhed each with ſix ſtamina or male parts. To this claſs belong the lilly, narciſſus, tulip, aſparagus, aloe, garlic, with ſeveral other genera.

HEXAPETALOUS FLOWERS, among botaniſts, are thoſe whoſe corolla conſiſts of ſix petals or flower leaves.

HEXAPLA, in church-hiſtory, a work publiſhed by Origen, containing a part of the Old Teſtament in the original Hebrew, with ſeveral verſions of it in ſix columns; from whence it was called hexapla, or the ſix-fold edition.

HEXASTYLE, in architecture, a building with ſix columns in front.

HIATUS properly ſignifies an opening, chaſm, or gap; but it is particularly applied to thoſe verſes where one word ends with a vowel, and the following word begins with one, and thereby occaſion the mouth to be more opened, and the ſound to be very harſh.

HIBISCUS, in botany, a genus of plants whoſe flower conſiſts of a double perſiſtent calyx, containing a quinquepetalous cordated corolla. The ſtamina are compoſed of a number of filaments joined in a column, and terminated with reniform antheræ. The fruit is a quinquevalvular capſule with five cells, which contains ſeveral kidney-ſhaped ſeeds.—This genus includes the malvaviſcus of Dillenius, and the ketmia of Tournefort, a ſpecies of which is the well known ſhrub commonly called althæa frutex.

HICCUP, or HICCOUGH, *Singultus*, in phyſic, a ſpaſmodic, convulſive, interrupted, and uneaſy concuſſion of the diaphragm and ſome of the parts affixed to it, made in inſpiration, and accompanied with a ſonorous exploſion of the air through the mouth.

HIDE, the ſkin of beaſts, but particularly applied to thoſe of large cattle, as bullocks, cows, horſes, &c.

HIDE *of Land*, was ſuch a quantity of land as might be plowed with one plough within the compaſs of a year, or ſo much as would maintain a family; ſome call it ſixty, ſome eighty, and ſome an hundred acres.

HIDE-BOUND, among farriers, a diſtemper in horſes when the ſkin ſticks ſo faſt to the back and ribs, that the hand cannot ſeparate one from the other without great difficulty; his body is at the ſame time lean, his back-bones ſtand up, his guts are for the moſt part deficient in moiſture, and his dung dry and more offenſive than common.

If a horſe become hide-bound by hard riding and ill keeping, he may be cured by good keeping. If it be the effect of a fever, or ſome other diſeaſe, if that be cured which is the cauſe, the effect will ceaſe; but if he has no fever upon him, and he is hide-bound only from lowneſs of blood and ſpirits, give him boiled barley, white-water, or the like, and when his fleſh is raiſed, harden it with good oats, beans, and moderate exerciſe.

HIERACIUM, hawkweed, in botany, a genus of plants, whoſe flower is compound, uniform, and imbricated; the corollulæ are monopetalous, linear, legulated, and indented in five parts; at the extremity of the ſtamina are five very ſhort hairy filaments topped with cylindraceous antheræ; a pericarpium is wanting, but the cup, which is ovated and connivent, contains the ſeeds, which are ſolitary, four-cornered, ſhort, and winged with down.

HIERACITES, *Hieracitæ*, in church-hiſtory, Chriſtian heretics in the third century, ſo called from their leader Hierax, a philoſopher of Egypt; who taught that Melchiſedec was the Holy Ghoſt, denied the reſurrection, and condemned marriage: he likewiſe held, that no one could be ſaved who died before he arrived at years of diſcretion. The diſciples of Hierax taught that the Word, or Son of God, was contained in the Father, as a little veſſel is contained in a great one; from whence they had the name Metangimoniſts, from the Greek word μεταγγιμονες, which ſignifies contained in a veſſel.

HIERARCHY, among divines, denotes the ſubordination of angels. See the article ANGEL.

HIERARCHY likewiſe denotes the ſubordination of the clergy, eccleſiaſtical polity, or the conſtitu-

tion and government of the Chriſtian church, conſidered as a ſociety.

HIEROGLYPHICS, in antiquity, myſtical characters, or ſymbols, in uſe among the Egyptians, and that as well in their writing as inſcriptions; being the figures of various animals, the parts of human bodies, and mechanical inſtruments.

HIGH, *Altus*, a term of relation, importing one thing's being ſuperior or above another: thus we ſay, a high mountain, the high court of parliament, high relievo, &c.

HIGH, in muſic, is ſometimes uſed in the ſame ſenſe with loud, and ſometimes in the ſame ſenſe with acute.

HIGH-WATER, the ſtate of the tide when higheſt, or the time juſt before it begins to ebb. See the article TIDE.

HIGH-WAY, a free paſſage for the king's ſubjects, on which account it is called the king's high-way, though the freehold of the ſoil belong to the lord of the manor, or the owner of the land.

HIGHNESS, a title given to princes. Before king James I. the kings of England had no other title but that of highneſs; which was alſo the caſe of the kings of Spain before Charles V.

At preſent all the ſons of crowned heads are ſtiled royal highneſs, as the electors of Germany are electoral highneſs.

HILARY-TERM, among lawyers. See TERM.

HILL, in the natural hiſtory of the earth. See MOUNTAIN.

Hills are of great uſe in a garden, as,

1. They ſerve as ſcreens to keep off the cold and nipping blaſts of the northern and eaſtern winds.

2. The long ridges and chains of lofty mountains, being generally found to run from eaſt to weſt, ſerve to ſtop the evagation of thoſe vapours towards the poles, without which they would all run from the hot countries, and leave them deſtitute of rain.

3. They condenſe thoſe vapours, like alembic heads, into clouds; and ſo, by a kind of external diſtillation, give origin to ſprings and rivers; and, by amaſſing, cooling, and conſtipating them, turn them into rain, and by that means render the fervid regions of the torrid zone habitable.

4. They ſerve for the production of a great number of vegetables and minerals, which are not found in other places.

It hath been found by experiment and calculation, that hills, though they meaſure twice as much as the plain ground they ſtand upon, yet the produce of the one can be no more than the other; and therefore, in purchaſing land, the hills ought not to be bought for more than their ſuperficial meaſure, i. e. to pay no more for two acres upon the ſide of an hill, than for one upon the plain, if the ſoil be equally rich.

It is true, that thoſe lands that are hilly and mountainous, are very different, as to their valuable contents, from what are found in flat and plain ground, whether they be planted, ſown, or built upon; as for example:

Suppoſe an hill contains four equal ſides, which meet in a point at the top; yet the contents of theſe four ſides can produce no more grain, or bear no more trees, than the plain ground on which the hill ſtands, or than the baſe of it; and yet by the meaſure of the ſides there may be double the number of acres, rods, and poles, which they meaſure on the baſe or ground-plot.

For as long as all plants preſerve their upright method of growing, hilly ground can bear no more plants in number than the plain at the baſe.

Again, as to building on an hill, the two ſides of an hill will bear no more than the ſame number of houſes than can ſtand in the line at the baſe.

And as to rails, or park-pailing over an hill, though the meaſure be near double over the hill to the line at the bottom, yet both may be incloſed by the ſame number of pales of the ſame breadth. *Miller's Gard. Dict.*

HIN, a Hebrew meaſure of capacity for things liquid, containing the ſixth part of an epha, or one gallon two pints, or two thouſand, five hundred and thirty-three ſolid inches, Engliſh meaſure.

HINE, a female ſtag in the third year of its age.

HIND CALF, a male hart, or hind, in the firſt year. She fawns in April or May.

HIND, or HINE, a huſbandman's ſervant. Thus a perſon who overſees the reſt, is called the maſter-hine.

HINGES, in building, thoſe iron-joints, whereby doors, tables, &c. open, ſhut, or fold, &c. Of theſe there are various ſpecies.

HIP, dog-roſe, a ſpecies of wild briar, with ſingle pentapetalous flowers, of a whitiſh colour, mixed with various ſhades of red. It is one of the largeſt plants of the roſe kind; grows wild in hedges; and flowers, as the garden ſorts, in June.

The fruit, the only part of the dog-roſe made uſe of in medicine among us, is agreeably dulco-acid, and ſtands recommended as a cooling reſtringent, in bilious fluxes, ſharpneſs of urine, and hot indiſpoſitions of the ſtomach: the freſh pulp is made in the ſhops into a conſerve, by mixing three ounces of it with five of fine ſugar. The pulp ſhould be ſeparated with great care from the rough prickly matter which incloſes the ſeeds; a ſmall quantity of which, retained in the conſerve, is apt to occaſion an uneaſineſs at the ſtomach, pruritus about the anus, and ſometimes vomiting.

HIP-GOUT, *Sciatica*. See the articles GOUT and SCIATICA.

HIP-MOULD is by ſome uſed for the back of the hip, but others underſtand it to mean the prototype or pattern, commonly made of a thin piece of wainſcot, by which the back and ſides of the hip are ſet out.

HIP-ROOF, among carpenters, called alſo Italian roof, is a roof which has neither gable-head, ſhread-head, nor jerken-head, by which is meant ſuch heads as are both gable and hip at the ſame end; for it is a gable or upright as high as the collar-beam, and then there are two ſhort hips, which ſhut up with their tops to the tops of a pair of rafters, which country carpenters call ſinglars. A hip-roof has rafters as long, and with the angles of the foot, &c. at the ends of the buildings, as it has at the ſides; and the feet of the rafters at the ends of ſuch buildings as have hip-roofs, ſtand on the ſame plane, viz. parallel with the horizon, and at the ſame height from the foundation, with rafters on the ſides of the roof.

HIPPOCAMPUS, the ſea-horſe, in ichthyology, the ſquare-bodied ſyngnathus, with no fin at the tail. It is five inches long, and where thickeſt, about an inch in diameter; the head is long, ſlender, and compreſſed, forming a kind of ſnout; the body is of a quadrangular figure, but the diviſions are not equal, and in the thickeſt part it is hexangular or heptangular.

It is a very ſingular and rare fiſh; the tail of which uſually curls up in the drying, and its head being bent down, gives it a rude reſemblance to a horſe; whence the name.

HIPPOCASTANUM, horſe-cheſnut, in botany. See HORSE-CHESNUT.

HIPPOCENTAUR, in antiquity, a fabulous animal, half man half horſe.

What gave riſe to the fable of hippocentaurs, was this. The Theſſalians are ſaid to have been the firſt inventors of the art of breaking horſes; and being firſt ſeen on horſeback, they ſeemed to make but one body with the horſes; whence the origin of the fable.

HIPPOCRAS, an infuſion of aromatic powders in wine, which is afterwards edulcorated with ſugar and honey; being ſo called becauſe that, when the infuſion is finiſhed, it is ſtrained through Hippocrates's ſleeve.

It is prepared of various aromatics and other ingredients, according to the different intentions to be anſwered.

HIPPOCRATES's SLEEVE, a kind of filtre or ſtraining bag formed by joining the oppoſite angles of a ſquare piece of flannel in form of a pyramid, and uſed to ſtrain ſyrups, decoctions, &c. for clarification.

HIPPOCREPIS, horſe-ſhoe vetch, in botany, a genus of plants producing papilionaceous flowers; the vexillum of each is cordated with a narrow baſe the length of the cup, the carina is lunulated and compreſſed, and the alæ are oval, oblong, and blunt. The fruit is a compreſſed pod, very long reflexed, and jointed like a horſe-ſhoe; the ſeed is ſingle in each joint, of an oblong and incurved figure.

HIPPODROME, in antiquity, the courſe where horſe-races weer performed.

HIPPOMANES, the manchineel tree, in botany. See MANCHINEEL.

HIPPOPHÆ, ſea-buckthorn, in botany, a genus producing male and female flowers on different plants; having no corolla, the cup of the male flower is divided into two parts, as is alſo the calyx of the female. The fruit is a globoſe unilocular berry, incloſing a roundiſh ſeed.

HIPPOPOTAMUS, the river horſe, a genus of quadrupeds, of the order of the jumenta, the characters of which are theſe: the fore-teeth of the upper jaw are four, and placed in pairs; thoſe of the lower jaw are prominent, and the intermediate ones are protended forward: the canine teeth are ſingle, and obliquely truncated; the teats are only two, and placed near the groin.

The hippopotamus is a native of Africa, paſſing a great part of its time under water, in the rivers of the Nile and Niger; but comes on ſhore to ſleep and breed. It is a large unwieldy animal, as big as an ox.

HIPPURIS, in botany, a genus of plants, whoſe flower has neither calyx, corolla, or perianthium, but conſiſts of a ſingle filament, placed in a receptacle, and topped with ſemibifid antheræ. The piſtillum is compoſed of an oblong germen with an awl-ſhaped ſtile, terminated with an acute ſtigma, which afterwards becomes a ſingle roundiſh naked ſeed.

HIRCUS, in anatomy, a part of the auricle or outer ear, being that eminence next the temples. See the article EAR.

HIRCUS, a goat, in aſtronomy, a ſtar of the firſt magnitude, the ſame with capella. See CAPELLA.

HIRTELLA, in botany, a genus of plants whoſe flower conſiſts of five roundiſh concave petals, with a monophyllous cup divided into five parts: the fruit is an oval berry, a little compreſſed, broadeſt at top, and obtuſely trigonal, containing a large ſeed of the ſame figure.

HIRUDO, the leech, in zoology, a well known naked inſect, with a flatted but not jointed body, and broader at the end than elſewhere, and the ſkin ſoft and gloſſy.

HISPID LEAF, among botaniſts, one whoſe ſurface is covered with more thick and rigid hairs than the piloſe leaves are.

HISPID STALK, among botaniſts, a ſtalk roughly hairy.

HISSING LETTERS, among grammarians, are S, X, and Z, ſo called on account of their harſh ſound.

HISTORICAL, ſomething that relates to hiſtory: thus we ſay, hiſtorical truth, hiſtorical ſtyle, hiſtorical narration of facts, &c. See the article HISTORY.

HISTORIOGRAPHER, a profeſſed hiſtorian, or writer of hiſtory.

HISTORY, an account, properly ſpeaking, of paſt

paſt tranſactions, narrated with ſuch important circumſtances as are proper to be tranſmitted to poſterity, and that in a regular continued ſeries.

Hiſtory is, of all others, the moſt difficult province. In other ſubjects there is a greater latitude for the writer's imagination; but, in hiſtory, he is confined to the occurrences he relates; and theſe, as they are not alike entertaining, require force and judgment in the narration to make them all agreeable. The richeſt fields of hiſtory are ſcenes of action and commotion, where nations are agitated by wars abroad, or factions at home. The moſt delicate part of an hiſtorian, which requires the deepeſt penetration, and ſoundeſt judgment, are the councils of ſtates and princes, the ſprings of action, the characters of men, the intereſt of parties, their different views, &c. Hiſtory will not admit thoſe decorations other ſubjects are capable of: the paſſions are not to be moved with any thing but the truth of the narration. All the force and beauty muſt lie in the order and expreſſion. To relate every event with perſpicuity, in ſuch words as beſt expreſs the nature of the ſubject, is the chief commendation of an hiſtorian's ſtyle. The colours facts are painted in, the ſtrength and ſignificancy of the ſeveral actions, the regular confuſion of a battle, the diſtractions of a tumult, ſo ſenſibly depicted, that in reading we ſeem to ſee them; this is the art and perfection of an hiſtorical ſtyle. An hiſtorian muſt not only write impartially, but nobly. He that ſpeaks to the whole world, and to all ages, that is the inſtructor of mankind, that pronounces the deſtiny of ſo many great men, and fixes their character with poſterity, what ſtrength of genius can be ſufficient for ſo important an enterprize? He muſt be capable of forming great and noble conceptions of things, and giving ſuch an exalted turn to his narration, as may truly comport with the dignity of his ſubject.

HISTORY, in painting, denotes a picture compoſed of divers figures, or perſons, repreſenting ſome tranſaction, either real or feigned. See PAINTING.

Natural HISTORY. See NATURAL.

HISTRIO, in the ancient drama, ſignified an actor or comedian, but more eſpecially a pantomime, who exhibited his part by geſtures and dancing.

HITCH, among ſailors, a certain knot or nooſe caſt upon a rope to faſten it to a poſt, ſhip, wharf, &c.

HITHE, or HYTHE, in old writers, denotes a port, wharf, or ſmall haven, to embark, or land wares at; as Queenhithe, &c.

HIVE, *Alveare*, in country affairs, a convenient receptacle for bees. See BEE.

HOACHE, in natural hiſtory, a kind of earth approaching to the nature of chalk, but harder, and feeling like ſoap; whence ſome think that it is either the ſame with our ſope-rock of Cornwall, or very like it. The Chineſe diſſolve it in water, till the liquor is of the conſiſtence of cream, and then varniſh their china-ware with it.

HOARSENESS, *Raucedo*, a preternatural roughneſs of the voice. The part affected is the aſpera arteria, particularly the larynx. This is a ſort of catarrhous indiſpoſition ariſing from a too great acrimony, thinneſs, or ſaltneſs of the lymph. Spermaceti, decoct. rapar. and rob. paſſular. are approved remedies in this diſorder.

HOASE, among ſailors, a piece of canvas ſewed together at the ſides, and made into the form of a tube, to convey water from one place to another; this is more particularly uſed in the hold or lower-apartments of the ſhip to fill the caſks which are already ſecurely ſtowed.

HOD, a well known inſtrument uſed by labourers to carry bricks, mortar, &c. in, at the building, or repairing of houſes, &c.

HOE, in country affairs, a tool made like a cooper's addz, to cut up weeds in gardens, fields, &c. This tool is commonly called the hand-hoe: for other ſorts of hoes ſee the next article.

This inſtrument is of great uſe, and ſhould be more employed in hacking and clearing the ſeveral corners, cracks, and patches of land, in ſpare times of the year, which would be of no ſmall advantage thereto.

HOEING, according to Tull, is the breaking or dividing the ſoil by tillage, while the corn, or other plants, are growing thereon. It differs from common tillage, which is always performed before the corn or plants are ſown or planted, or in the time of performing it: and it is much more beneficial to the crops than any other tillage. This ſort of tillage is performed various ways, and by means of different inſtruments. Land which, before the tillage, would have yielded little, though the more it is tilled before ſowing, the more plenty of corn it yields, yet, if tilled only before the ſowing, will always have ſome weeds, and they will partake of the advantage of the tillage as well as the corn. This is one reaſon for an after tillage, ſuch as that by hoeing. But there is another conſideration that yet more requires it; this is, that as ſoon as the ploughman has done his buſineſs, by ploughing and hoeing the land, after ſowing, the ſoil, of its own accord, begins to undo it all again, by tending towards its original texture and ſpecific gravity again; the altering of which was the only buſineſs of all the former tillage. The breaking the particles of the earth, and making in it new pores, and new particles, or new ſuperficies, is the great buſineſs of the plough and harrow; but, as ſoon as their uſe is over, the earth begins to coaleſce again into its former form, the particles unite together, and the artificial pores in a great meaſure cloſe up. The ſeed is nouriſhed in a worſe ground than it was firſt put into, and the more the plant grows up, and requires a larger ſupply of food, the worſe the paſture

ſture becomes. While nouriſhment is thus denied the growing plants, they are at the ſame time choaked with weeds, which, being of a hardier nature than they, will grow with leſs ſupplies, and therefore thrive more vigorouſly, and rob them of a great part of the little food the land before allowed them.

Farmers in all ages have been acquainted, in ſome degree, with the uſe of tillage and dung to crops of uſeful plants; but they have ſo ill managed the time of giving theſe aſſiſtances to nature, that there is no doubt but one third part of the nouriſhment raiſed by dung and tillage, if it were given to plants and corn at many proper ſeaſons, and proportioned to the different times of their exigencies, would be of more benefit to the crop than the whole is, when applied all together at the time of ſowing.

Nature, by what ſhe does in the animal œconomy, ſeems to point out to us ſomething like the remedying this by hoeing; for when the teeth, as the plough, have tilled that ſoil or maſs which is earth-altered; and when the ſaliva and the juices of the ſtomach have ſerved to divide and attenuate it, as the ſalts of dung and other manure do land; after all this, the bile and pancreatic juices are ordained to farther attenuate it, at the very time when it is ready to be exhauſted by the numerous mouths of the lacteals, ſituate in the inteſtines. This laſt operation of theſe juices ſeems analogous to the meliorating the ſoil by hoeing, after the plants are grown, and are becoming fit for uſe.

Tranſplanting is nearly allied in its nature to hoeing, but it is much inferior. The nature of this will not admit of its being a general thing; and even if it would, hoeing is better: for by tranſplanting, the plants can only be kept up to a certain period, after which they will not bear it; but hoeing may be uſed to them with advantage, to their utmoſt ſtanding, and make them vigorous all the while.

The roots of a plant are all neceſſarily broken off in tranſplanting, and it requires ſome time for it to ſtrike a whole ſet of new ones; and if the earth about it is not kept thoroughly moiſtened all this time, the new formed roots will not be able to ſhoot, and the plant will ſtarve in the midſt of plenty: but, on the contrary, in hoeing, the ſame advantage of a new paſture for the plant is obtained, by the breaking the particles of the earth, and at the ſame time no more of the roots are broken off than can eaſily be ſupplied, and the reſt remaining in their places, the plant continues growing without that ſtop or decay, which muſt happen on tranſplanting, and which it recovers only by degrees. It is obſerved, that ſome plants are the worſe for tranſplanting: lucerne and ſaintfoin are never ſo good after tranſplanting, as when they are left in their native places, at the ſame diſtances; and ſinochia, removed, is never ſo good and tender as when it is not. This laſt plant receives ſuch a check from tranſplanting in its infancy, that it has afterwards a diſeaſe like the rickets, which cauſes knots and ſwellings in it, that ſpoil it as a delicacy. All the tap-rooted plants ſuffer by tranſplanting; for it is neceſſary in this to cut off the long-main root, which afterwards, however good the ſoil may be, never arrives at the length it otherwiſe would have had, and which was neceſſary for the ſucceſs of the plant.

One great benefit of hoeing is, that it keeps plants moiſt in dry weather, the advantage of which to their growth is eaſily ſeen. This good office it performs on a double account. Firſt, as they are better nouriſhed by hoeing, they require leſs moiſture, and conſequently carry off leſs; for thoſe plants which receive the greateſt increaſe, having moſt terreſtrial nouriſhment, carry off the leaſt water, in proportion to their augment, as is proved by Woodward's experiments. Thus barley or oats, being ſown on a piece of ground well divided by tillage and dung, will come up and grow well without rains, when the ſame grains ſown on another part of the ſame land, not thus dunged or tilled, will ſcarce come up at all without rains, or if they do, will wait wholly for the rains for their growth and increaſe.

The hoe alſo, particularly the horſe-hoe, for the other does not go deep enough, procures moiſture for the roots from the dews which fall moſt in dry weather; and theſe dews ſeem to be the moſt enriching of all moiſture, as it contains in it a fine black earth, which will ſubſide from it in ſtanding, and which ſeems fine enough to be the proper pabulum, or food for plants.

A demonſtration that the tilled earth receives an advantage from theſe dews, which the untilled does not, is this; dig a hole in any piece of land, of ſuch a depth as the plough uſually goes to; fill this with powdered earth, and, after a day or two, examine the place, and the bottom part of this earth, and bottom of the hole, will be found moiſt, while all the reſt of the ground, at the ſame depth, is dry. Or, if a field be tilled in lands, and one land be made fine by frequent deep ploughings, while another is left rough by inſufficient tillage, and the whole field be then ploughed a-croſs in dry weather, which has continued long, every fine land will be turned up moiſt, and every rough land as dry as powder from top to bottom.

Although hard ground, when thoroughly ſoaked with rain, will continue wet longer than fine tilled land adjoining to it, yet, this water ſerves rather to chill than to nouriſh the plants ſtanding in it, and to keep out the other benefits of the atmoſphere; it leaves the ground much harder alſo than before, when it is finally exhaled out of it; and when, at length, the earth is then hardened, it can receive

no benefit from any thing leſs than a deluge of rain, which ſeldom falls till the ſeaſon of vegetation is over.

As fine hoed ground is not ſo long ſoaked with rain, ſo the fine dews never ſuffer it to become perfectly dry. This appears from the flouriſhing ſtate of plants in hoed ground, while others near them, but in ground not hoed, are ſtarved for want of nouriſhment. The common opinion is againſt this, but obſervation proves it to be true againſt the common opinion. The vulgar are guided by this, however, and will not hoe their ground in dry weather for fear of letting in the drought, as they call it; whereas hoeing this is the only method of keeping away the drought, and without either this, or watering, they muſt periſh in theſe ſeaſons. *Tull's Horſe-Hoeing Huſbandry.*

HOG, *ſus*, in zoology, a genus of quadrupeds, of the order of the jumenta, the characters of which are theſe: the upper fore-teeth are four in number, and are convergent; thoſe of the lower-jaw are eight, and are patulous: the canine teeth of the upper jaw are two, and very ſhort; thoſe of the under jaw are ſingle, and exerted: the crown of the head is carinated, and the hoof is divided. See the article SWINE.

Beſides the common hog, there are ſeveral other ſpecies, as, 1. the American hog, with the back briſtly behind, and with a naked tail: 2. the muſk-hog, with a cyſt, or gland on the back, in which is ſecreted a perfumed fluid; its tail is naked: 3. the babyrouſſa, with two teeth growing on the forehead.

HOGSHEAD, in commerce, a meaſure of capacity, containing ſixty-three gallons.

HOISING, in the ſea-language, the act of drawing up any weighty body by the help of a tackle or complication of pullies.

HOKE-DAY, the Tueſday after Eaſter-week; which was the day on which the Engliſh conquered and expelled the Danes: this was, therefore, kept as a day of rejoicing, and a duty, called Hoke-Tueſday-Money, was paid to the landlord, for giving his tenants and bondmen leave to celebrate it.

HOLCUS, Indian millet, in botany, a genus of plants, whoſe flowers are male and hermaphrodite on the ſame plant: the corolla of the hermaphrodite flower is a bivalvular glume, with three capillary ſtamina and two ſtyles, and contains an oval ſeed involved in the corolla; the male flower is deſtitute of a corolla, the cup being a glume, containing three hairy filaments topped with oblong antheræ.

HOLD, in ſhip-building, all that part of a ſhip's inſide which reaches from end to end, from the lower deck to the floor or bottom; and contains the cargo, proviſions, &c.

HOLDFAST, a large piece of iron, in the ſhape of the letter S, fixed in a wall to ſtrengthen it: alſo a tool uſed by joiners, carvers, &c. which goes thro' their benches, to hold faſt ſuch work as cannot be finiſhed by its being held in the hand.

HOLIBUT, the name of a very large flat fiſh, reſembling the flounder, but longer in proportion to its breadth.

HOLLAND, in commerce, a fine and cloſe kind of linen, ſo called from its firſt being manufactured in Holland. See the article LINEN.

HOLLOW, in architecture, a concave moulding, about a quarter of a circle, called by ſome a caſement, and by others an abacus.

HOLLOW-SQUARE, in the military art, a body of foot drawn up, with an empty ſpace in the middle for colours, drums, and baggage.

HOLLOW-TOWER, according to Hanis, is a rounding made of the remainder of two briſures, to join the curtain to the orillon, where the ſmall ſhot are played, that they may not be ſo much expoſed to the view of the enemy.

HOLLY, *Ilex*, in botany, a well known evergreen, formerly very much planted in gardens as an ornament; it grows naturally in woods and foreſts in many parts of England, riſing to twenty or thirty feet in height; the ſtem by age becomes large, and is covered with a greyiſh bark; the leaves, which are armed with thorns, are placed alternately on every ſide of the branches: the flowers are of a dirty white, and appear in May; theſe are ſucceeded by roundiſh berries, which turn red in autumn, and continue on the trees till after Chriſtmas.

This tree is raiſed by ſowing the berries in the ſpring, but they will not come up till the year following. There are ſeveral varieties of variegated hollies, which are increaſed by grafting or inoculating them on the common ſort. The holly makes an excellent fence, and for that purpoſe is preferable to moſt other plants; but its being a ſlow grower at firſt, deters ſeveral from uſing it; but when it does take to growing, it makes amends by its height, ſtrength, and thickneſs.

From the bark of the common holly is made the bird-lime, and the wood is made into hones for ſetting razors; it is the whiteſt of all hard-woods, and therefore uſed by inlayers; it is alſo uſed by millwrights, turners, &c.

Knee-HOLLY, a name given to butchers-broom. See the article RUSCUS.

Sea-HOLLY. See ERYNGIUM.

HOLLYHOCK. See ALCEA.

HOLOCAUST, a burnt-offering, or ſacrifice, wholly conſumed by fire; of this kind was the daily ſacrifice in the Jewiſh church. This was done by way of acknowledgement, that the perſon offering, and all that belonged to him, were the effects of the Divine bounty. The heathens, who alſo offered holocauſts, probably conſidered them in the ſame light: and the diſpoſing of ſacrifices this way was the

the general cuſtom, till Promotheus introduced the cuſtom of burning only a part, and retaining the remainder for his own table.

HOLOGRAPH, in the civil law, an inſtrument entirely in the hand-writing of the perſon who ſigns it.

HOLOMETER, a mathematical inſtrument for taking all ſorts of meaſures, both on the earth and in the heavens; it is the ſame with the pantometer.

HOLOSTEUM, in botany, a genus of plants, whoſe flower conſiſts of five bipartite, obtuſe, equal petals, with thee ſtamina: the fruit is an unilocular, ovate capſule, containing a number of roundiſh ſeeds.

HOLY-GHOST, one of the perſons of the holy Trinity.

Order of the HOLY-GHOST, the principal military order in France, inſtituted by Henry III. in 1569. It conſiſts of an hundred knights, who are to make proof of their nobility for three deſcents. The king is the grand maſter, or ſovereign, and as ſuch, takes an oath on his coronation-day, to maintain the dignity of the order.

HOLY-THURSDAY, the ſame with aſcenſion-day. See ASCENSION.

HOLY-DAYS, the ſame with feſtivals. See the article FESTIVAL.

HOLY-ROOD-DAY, a feſtival otherwiſe called the exaltation of the croſs.

HOLY-THISTLE, in botany. See the articles CNICUS and CARDUUS-BENEDICTUS.

HOMAGE, in law, is the ſubmiſſion, loyalty, and ſervice which a tenant promiſed to his lord, when he was firſt admitted to the land which he held of the lord in fee: alſo that owing to a king, or to any ſuperior.

HOMAGE-JURY, a jury in a court baron, conſiſting of tenants that do homage to the lord of the fee.

This jury makes enquiry into, and preſentments of, defaults and deaths of tenants, and of admittances and ſurrenders into the lord's court.

HOMESOKEN, a privilege enjoyed by every perſon in his own houſe or home, which ought not to be invaded.

HOMICIDE, in common law, the killing a man. It is divided into voluntary and caſual. Caſual is either merely caſual, or mixed; the former is when a perſon kills another by pure miſchance, being about his lawful occaſions: it is accounted mixed, when there is negligence or ſome unwarrantable circumſtance attending the action. Voluntary homicide, that which is deliberate; and is either with a precedent malice, or without: the former is a felonious killing, with malice prepenſe, any perſon in the realm, who is under his majeſty's protection.

HOMILY, in eccleſiaſtical writers, a ſermon, or diſcourſe, upon ſome point of religion, delivered in a plain manner, ſo as to be eaſily underſtood by the common people.

HOMODROMUS VECTIS, that kind of lever, in which the weight is in the middle, between the power and the fulcrum, or the power in the middle between the weight and the fulcrum. See LEVER.

HOMOGENEUS, or HOMOGENEAL, denotes ſuch ſubjects as conſiſt of parts of the ſame nature, in contradiſtinction to heterogeneous, where the parts are of different natures.

HOMOGENEAL LIGHT, that whoſe rays are all of the ſame colour, degree of refrangibility, and reflexibility. See COLOUR.

HOMOGENEAL NUMBERS, ſuch as are of the ſame kind.

HOMOGENEAL SURDS, ſuch as have one common radical ſign, as $\sqrt{^2} a \sqrt{^2} b$, or $\sqrt{^3} b^3$. See the article SURDS.

HOMOGENEUM COMPARATIONIS, in algebra, the known quantity in an equation, the ſame with abſolute number. It is ſo called to diſtinguiſh it from the other terms, which, though homogeneous, are not the quantities to which things are here referred.

HOMOLOGOUS, in geometry, is applied to the correſpondent ſides and angles of ſimilar and equiangular figures, which are ſaid to be homologous, or in proportion to one another.

HOMOLOGOUS THINGS, in logic, thoſe which agree in name, but are of different natures.

HOMONYMOUS, an appellation given to words which have two different ſignifications, being the ſame with equivocal terms.

HONE, a fine kind of whetſtone, uſed for ſetting razors, pen-knives, and the like.

HONEY, *Mel*, a ſweet vegetable juice, collected by the bee from the flowers of different plants, and depoſited in the cells of the combs; from which it is extracted, either by ſpontaneous percolation through a ſieve in a warm place, or by expreſſion. That which runs ſpontaneouſly is purer than the expreſſed; a quantity of the waxy and other impurities being forced out along with it by the preſſure, eſpecially when the combs are previouſly heated. The beſt ſort of honey is of a thick conſiſtence, a whitiſh colour, an agreeable ſmell, and very pleaſant taſte: both the colour and flavour are ſaid to differ in ſome degree according to the plants which the bees collect it from.

Honey expoſed to a gentle heat, as that of a warm bath, becomes thin, and throws up to the ſurface its waxy impurities, together with the meal or flower, ſometimes fraudulently mingled with it, which may thus be ſeparated by diſpumation, ſo as to leave the honey pure. On continuing the heat, there riſes a conſiderable quantity of aqueous fluid, impregned with the fine ſmell of the honey: the inſpiſſated reſiduum, like the honey at firſt, diſ-

ſolves

ſolves both in water and in rectified ſpirit, and promotes the union of oily and reſinous ſubſtances with watery liquors. By treating the inſpiſſated maſs with moiſt clay, as practiſed by the ſugar-bakers for purifying ſugar from its unctuous treacly matter, the unctuous parts of honey may in like manner be ſeparated, and its pure ſweet matter obtained in the form of a ſolid, ſaline, white concrete.

This juice is an uſeful ſweet, for medicinal as well as for domeſtic purpoſes; more aperient and detergent than the ſimpler ſweet prepared from the ſugar cane; particular ſervicable for promoting expectoration in diſorders of the breaſt, and as an ingredient in cooling and detergent gargariſms. For theſe, and other ſimilar intentions, it is ſometimes mixed with vinegar, in the proportion of about two pounds to a pint, and the mixture boiled down to the conſiſtence of a ſyrup; ſometimes impregnated with the virtues of different vegetables, by boiling in like manner with their juices or infuſions, till the watery parts of the juice or infuſion have exhaled and left the active matter incorporated with the honey. The boiling of honey, though it diſſipates great part of its odorous matter, and thus proves in ſome caſes injurious to it, is in ſome caſes alſo of advantage: there are particular conſtitutions, with which honey remarkably diſagrees, and in which even very ſmall quantities occaſion gripes, purging, and great diſorder: by boiling, it loſes of that quality by which it produces theſe effects.

HONEY-COMB, a waxen ſtructure full of cells, framed by the bees to depoſit their honey, eggs, &c.

There is ſomething very wonderful in the conſtruction of the cells in the honey-comb. Each cell conſiſts of ſix plane ſides, which are all trapeziums, but equal to each other. The bottom of the cell is contrived with three rhombus's, HKDI, DEFI, and FIGH (pl. LX. *fig.* 3.) ſo diſpoſed as to conſtitute a ſolid angle at I, under the three equal angles DIH, DIF, and HIF; each of which is double the maximum angle of $54^\circ 44' =$ DIK=DKI. Hence it comes to paſs, that a leſs quantity of ſurface is ſufficient to contain a given quantity of honey, than if the bottom had been flat, in the proportion of 4658 to 5550, as has been found by calculation; that is, nearly $\frac{1}{5}$ of the whole, ſo far as the figure of the ends of the cells extend in each, which fifth part of wax and labour ſaved, amounts to a vaſt deal in the whole comb. And if theſe admirable inſects knew their advantage, they could not more nicely obſerve the rules of the modern geometry. Hence we may obſerve, that though the method of diſcovering the maxima and minima of quantities by fluxions is a part of knowledge which the mathematicians have but lately acquired, and which they eſteem the ſublimity of human ſcience, yet this very thing was imparted to theſe inſects at the firſt creation of things.

The celerity with which a ſwarm of bees received into a hive, where they find themſelves lodged to their minds, bring their works of the combs to perfection, is amazing. There are vaſt numbers at work all at once; and that they may not incommode one another, they do not work upon the firſt comb till it is finiſhed, but when the foundation of that is laid, they go to work upon another, ſo that there are often the beginnings of three or four ſtories made at once, and ſo many ſwarms allotted to the carrying on the work of each.

HONEY-COMB, in gunnery, a flaw in the metal of a piece of ordnance, when it is ill caſt and ſpongeous.

HONOUR-POINT, in heraldry, is that next above the center of the eſcutcheon, dividing the upper part into two equal portions. See the article POINT.

HONEYSUCKLE. See LONICERA.

French HONEYSUCKLE. See HEDYSARUM.

HONEYWORT. See CERINTHE.

HOOD, in falconry, a piece of leather, with which the head of a hawk, falcon, &c. is covered.

HOOF, *Ungula*, the horny ſubſtance that covers the feet of divers animals, as oxen, horſes, ſheep, &c.

A horſe's hoof ſhould be of a round, not longiſh figure; and its ſubſtance ſolid, tough, high, ſmooth, without any circles, ſomewhat ſhining, and of a dark colour; for that which is white is commonly brittle; in ſhort, it ought to be of the colour of the hoof of a deer, and the whole foot round, but a little larger below than above; upright, and ſomewhat hollow on the inſide, and ſo diſpoſed that he may tread more on the toe than the heel.

The hoof of a horſe is either perfect or imperfect: an imperfect hoof is one that wants any of the above qualities; and, 1. May be broad and ſpreading out at the ſides and quarters; ſuch a horſe has, for the moſt part narrow heels, and will ſoon be flat-hoofed; he will neither carry a ſhoe long, nor travel far. 2. Others are rugged or brittle-hoofed, which is a ſign that it is too hot and dry. 3. Some are long, which cauſes the horſe to tread all upon his heels, and by that means to breed wind-galls. 4. There are ſome crooked hoofs, broad on the outſides and narrow within, by which means the horſe is ſplay-footed. 5. Others have flat hoofs, and not hollow within, which give riſe to the inconveniencies above ſpecified in the firſt ſort of imperfect hoofs; but if it be too hollow, it will dry too faſt, and make him hoof bound. 6. When the fruſh is broad, the heels will be weak and ſoft, and the horſe will never tread boldly on the ground. 7. Some have narrow heels; theſe are the tendereſt of all, and the horſe will grow hoof-bound.

Bony HOOF is the round bony ſwelling, growing

on the very top of a horſe's hoof, which is always cauſed by ſome blow or bruiſe.

The method of cure is, firſt to digeſt the ſwelling, either with rotten litter, or hay boiled in ſtale urine, or with a plaſter of ſtale wine lees and wheat flower boiled together, in order to ripen it, and bring it to ſuppuration, or to diſſolve the tumor. If it come to a head, lance it in the loweſt part of the ſoftneſs, with a thin hot iron, to let out the matter; then tent it with turpentine, deer's ſuet, and wax, equal quantities of which ſhould be boiled together; and laying a plaſter of the ſame ſalve over it, to keep in the tent till it be thoroughly well.

Hoof-Bound, this diſorder is a ſhrinking of the hoof at the top and at the heel, which makes the ſkin ſtare above the hoof, and grow over it.

This diſorder may happen to a horſe, either by keeping him too dry in the ſtable, by ſtreight ſhoeing, or by ſome unnatural heat after foundering.

Hoof-Brittle, an infirmity in horſes, proceeding either naturally, from the ſire or dam; or accidentally, from a ſurfeit falling down into the feet; or from the horſe's being formerly foundered.

For the cure, take unwrought wax, turpentine, ſheep's ſuit, and hog's greaſe, of each four ounces; ſallad oil, a quarter of a pint; and of dog's greaſe, half a pound: boil them all together, and with this mixture, anoint the hoof well for two or three days, eſpecially at the ſetting on of the hair, and ſtop them with cow-dung and dog's greaſe, melted together.

Hoof-Swelled, a diſorder that ſometimes happens by a prick, or a young horſe's being overridden, or too hard wrought, and which, if not ſpeedily removed, will beget a wet ſpaven.

For the cure, take the ſtrongeſt aqua-fortis you can get, and firſt file or draw away the old hoof ſomewhat near, with a file or drawing-iron; then touch what is left of the hoof, three or four dreſſings or more, with the aqua-fortis; and anoint the foot with an ointment made of one pound of hog's greaſe; patch-greaſe, three quarters of a pound; Venice-turpentine, five ounces; new wax, three ounces; and ſallad oil three ounces; all melted together over the fire; and by anointing the coffin of the foot quite up to the top, you will cauſe a new hoof to grow upon it.

HOOK-Pins are bolts made with a ſhoulder at one end, and uſed by carpenters in framing: theſe are drove through the mortices and tenants of the work, prepared for building or wharfing.

HOP, *Lupulus*, or *humulus*, in botany, a plant of the dioecia pentandria claſs; neither the male nor female flower of which has any corolla; the cup of the male flower is compoſed of five leaves, that of the female is an acute quadrifid involucrum, large and of an oval figure; the ſeed is ſingle, roundiſh, covered with a coat, and contained in the baſe of the cup.—It hath a creeping root, with ſuch weak ſtalks that they could not ſupport themſelves without twiſting about whatever is near them; they are exceeding long, rough, angular, hairy, and hollow, and the leaves proceed from the ſtalks by pairs, and are placed oppoſite; they are generally divided into three, and ſometimes into five ſegments, and are ſerrated on their edges; the leaves are not in uſe, but the flowers is a well-known ingredient in beer and other malt liquors.

For the cultivation of hops, a rich, deep, mellow, dry ſoil, more inclining to ſand than clay, is in general the beſt; and in particular, a black garden mould is excellent. Stiff clays, ſpewy lands, ſuch as are apt to be overflown by floods, hard gravels, ſtony grounds, very ſandy ones, and ſuch as are not at leaſt a foot and an half deep, are altogether improper for hops.

The beſt ſituation for hop-grounds is ſuch as inclines to the ſouth, or lies open to it, ſo that they may have the benefit of the ſun during the greateſt part of the day. It muſt alſo be open, for the air to have a free paſſage and circulation between the plants; and it ſhould be ſo ſheltered to the eaſt, north, and weſt, that neither the froſty winds in the ſpring muy cut off the young ſprouts, nor the more ſtormy ones in ſummer and autumn deſtroy the full-grown hops.

The ground and ſituation being choſen, the next buſineſs is to prepare it for the planting. In many parts of England, when the ground is broken up for this purpoſe, the plough goes firſt, and men follow it with the ſpades, with which they dig one ſpit deep in the furrows where the plough has paſſed, throw up the earth thus dug, and ſo continue to plough and dig till the whole is done. Either this tillage, if it be well performed, or the deep ploughings, croſs-ploughings, and harrowings, by which careful huſbandmen prepare their land for corn, will fit this for being ſown with turnip-ſeeds in the end of July, or beginning of Auguſt, and if the turnips are hoed twice, ſo as to be left about eight inches aſunder, they will yield a good crop, the weeds will be deſtroyed, and the ground will be rendered looſe and fine. Another good ploughing after the turnips are taken off, will, with the enſuing winter mellowing, render it fit for being planted with hops in the ſpring.

The beſt time to begin the ploughing is in October, in order that the ſoil may be properly prepared to receive the benefits of the winter's froſts, rains, and ſnows; after which, in the beginning of ſpring, it ſhould be well and deeply ploughed again, and well harrowed; and after another ploughing in March, which will be of very great ſervice, it ſhould be harrowed fine, and laid as even as can be.

When the ground is in proper readineſs for planting, ſtretch along a ſtrait ſide of the field, at fifteen or twenty feet diſtance from the hedge, and parellel to it, a line with knots or rags tied in it, as far aſunder as you deſign your hills to be, and ſtick in the ground a ſharp pointed ſtick at every knot, as marks for the places where the hills are to be made: continue the line in this manner the whole length of the ground, and from this firſt row you may mark out the reſt of the field, either in ſquares, chequerwiſe, at the intended diſtance of the hills, or in the quincunx form, where the hills of every row lie oppoſite to the middle of the firſt, in a triangular form.

The diſtance of the hills ſhould be, in ſome meaſure, regulated by the nature and goodneſs of the ſoil: but, in every caſe, they ſhould be far enough aſunder to admit the hoe-plough at all times without danger to the plants. If the ſoil be dry and ſhallow, ſix or ſeven feet will be a convenient diſtance: but if it be rich, moiſt, and apt to bear large hops and leaves, it may be right to allow eight or nine feet between the hills.

The moſt proper ſeaſon for planting hops is from the beginning of March to near the middle of April, at the time when they begin to ſhoot. The Kentiſh huſbandmen approve likewiſe of october: but the common ſorts are not to be procured then, unleſs it be from a ground that is to be dug up and deſtroyed: beſides which, there is ſome danger in their rotting in the earth, if the winter ſhould prove very wet.

There are ſeveral ſorts, though the botaniſts allow but one ſpecies, of hops. The moſt eſteemed are, the long white, the oval, and the long ſquare garlic hop. Theſe differ from each other in the colour and ſhape of their bells, or hops, in their degree of bearing, and in their time of ripening. The long white is moſt valued, becauſe it is a great bearer, and produces the moſt beautiful hops; for the beauty of hops conſiſts of their being of a pale bright green colour. The oval hop is beautiful, but does not yield ſo large a crop. There is a ſort of this kind of white hop, called the early, or rath hop, which ripens a week or ten days before the common, and is therefore of advantage to thoſe who would be firſt at market: but it is tenderer than the other, and does not bear near ſo plentifully. The long ſquare garlic hop is the greateſt bearer, more hardy, and ſomewhat later ripe than the former; but by reaſon of its redneſs towards the ſtalk, it is not ſo beautiful to the eye, and therefore is not ſo much eſteemed as the other ſorts.

Few hop grounds are without ſome plants of a ſort of hop which many call the female hop, but very erroneouſly; for the female hop is that which is cultivated for uſe, and this, which others name more properly the wild hop, is the male. Towards the middle of July, it puts out a great number of long looſe bunches of ſmall flowers, not at all like the true hop; and in ſomewhat leſs than a month after, that is to ſay, juſt before the true hop begins to bloſſom, they ripen, and with the leaſt motion of the wind, ſhed a farina, which is wafted all around, and is by ſome, not improbably, thought to be of uſe to impregnate other hops. Thoſe who are of this opinion adviſe therefore to leave one or two hills of them ſtanding in the hop-ground. But the common practice is to mark them at their firſt appearance, and to root them out afterwards, becauſe they do not bear bells or hops, and as they are generally the ſtrongeſt plants, ſets might otherwiſe be taken from them by miſtake.

There is alſo a poor ſtarved hop, called a wild hop, which is not judged to be a diſtinct ſort, but a hop which has degenerated for want of culture.

The planter of hops ought to be extremely careful in the choice of his plants, or ſets, particularly in regard to the kind of the hop: for it is a great trouble and loſs to him when his garden proves to be a mixture of ſeveral ſorts of hops, ripening at different times. He who plants the three ſorts abovementioned, viz. the early, the long white, and the ſquare hop, in three diſtinct parts of his ground, will have the conveniency of picking them ſucceſſively as they become ripe.

Hop-ſets are cuttings from the roots or branches which grow from the main root or ſtock. They ſhould be procured, if poſſible, from grounds planted with none but the ſort which is deſired; and they ſhould be from five to ſeven or eight inches long, with three or more joints or buds on them, all the old bind and hollow part of the ſet being cut off.

The ground being prepared for planting, as before directed, towards the latter end of February, or in the beginning of March, if the ſoil be light, or late in March if it be ſtrong and moiſt, make, in the places marked out by the ſticks ſtuck in them, holes about twelve or ſixteen inches wide, and of a depth proportioned to the nature of the ground. In general, ten or twelve inches will be a ſufficient depth. If the ground be ſhallow, and you meet with hard clay or gravel, by no means enter into this, for you would then make a baſon to retain water; but, in ſuch caſe, inſtead of going deeper, raiſe up a ſmall hill of good mould. If there is a good depth of rich mellow mould, dig the hole a foot and a half or two feet deep, and you will find the hops thrive the better; for their tap roots naturally run downward.

When all things are ready for planting, fill up the holes with the mould before thrown out of them, if it be naturally good, after having firſt broke it fine with a ſpade: but if the ſame earth be not rich enough, make uſe of fine freſh mould, or of the compoſt provided for this purpoſe. About a peck

or two of this will be ſufficient for each hill; but no new dung ſhould be put into the hole on any account.

Then, with a dibble or ſetting ſtick, ſuch as gardeners generally uſe for planting of beans, make five or ſix holes, the depth of your ſets, one in the middle, perpendicular, and the reſt round about, ſloping, and meeting at the top near the center: put your ſets therein, ſo that they may ſtand even with the ſurface of the ground; and then preſs the mould cloſe to them, and cover them with fine mould two or three inches thick. A ſtick ſhould be placed on each ſide of the hill to ſecure it.

The ground being thus planted, all that is to be done in the following ſummer, is to keep the hills and alleys clear from weeds by frequent hoeings; to dig the ground in the month of May, and to carry off all the ſtones that are turned up by digging; to raiſe a ſmall hill about the plants; to throw ſome fine mould on their roots; and in the latter end of May, or beginning of June, to twiſt all the vines and branches together into a bunch or looſe knot, and lay them thus twiſted on the top of the hill.

Towards the latter end of February, or in the beginning of March, in the ſecond year, when the weather is kindly, open the hills, and with a ſharp kniſe cut off the ſhoots of the firſt year to within an inch of the old ſtock, together with all the younger ſuckers that have ſprung from the ſets, and cover the ſtock with fine earth. To keep the knife ſharp, you ſhould have a whetſtone always by you at dreſſing.

In the third and following years, when you dig your hop-ground in February, let the earth be taken away with a ſpade, or hoe, round about the hill, very near them, that you may the more conveniently come at the ſtock to cut it: then in fair weather, towards the beginning of March, if your hops be weak, begin to dreſs them; but if they are ſtrong, and in heart, the middle or latter end of March will be the beſt time; for late dreſſing reſtrains their too early ſpringing, which is the cauſe of many injuries to the hop.

After the hops are dreſſed in the ſecond year, the next buſineſs is to pole them. Poles of only ten or twelve feet long will do then; but in the third year, by which time they come to their full bearing ſtate, they will require poles of full ſize: this, if the ground be rich, and the hop vigorous, will be from ſixteen to twenty feet, or even more; or there will be danger of loſing great part of the crop.

If the hop be weak, and the ground not rich, the poles ſhould not be more than fourteen or eighteen feet long, for fear of impoveriſhing the root; for the hop will ſoon run itſelf out of heart if over poled; ſo that, as was ſaid before, there is more danger in over-poling than in under-poling: neither can a good crop be expected from an over-poled ground, becauſe the branches which bear the hops grow very little till the buds have over-reached the poles, which they cannot do when the pole is too long. Two ſmall poles are ſufficient for a hill in a young ground.

Towards the latter end of July, hops begin to bloſſom, about the beginning of Auguſt they bell, and in forward years, they are ſometimes ripe at the end of Auguſt, or beginning of September. When they begin to change colour, or are eaſily pulled to pieces, when they emit a fragrant ſmell, and when their ſeeds begin to look brown and to grow hard, you may conclude that they are ripe: then pick them with all expedition; for a ſtorm of wind will do them great miſchief at this time; and hops picked green and bright, without bruiſing or diſcolouring, will ſell for a third part more than thoſe that are otherwiſe.

When the poles are drawn up in order to be picked, the vines around them ſhould be cut aſunder at the height of about three or four feet from the ground; for the cutting of them lower, eſpecially while the hops are green, would occaſion ſo great a flowing of the ſap, as would weaken and hurt the root.

The moſt convenient way of picking them is into a long ſquare frame of wood, called a bin. This frame is made of two poles, or pieces of wood, each nine or ten feet long, and three or four inches broad, joined together at about a foot and a half from each end, by two other pieces three feet long; and it is ſupported by four legs three feet and a half high; ſo that there remain in the middle of it a ſpace ſix feet long, three wide, and three and a half deep. In this ſpace is fixed a coarſe linen cloth, or hop-bag, cut open on one ſide, and hung hollow, either by hitching it on tenter-hooks along the ſide of the frame, or by ſtretching it on the outſide with wooden ſkewers, to receive the hops as they are picked. Three men or women, or four boys or girls, may ſtand at each ſide of the frame, and pick two poles at a time.

The hops ſhould be picked as free as poſſible from leaves and ſtalks; for theſe would be of greater prejudice to the ſale, than any ſeeming advantage which might be expected from their weight. The bin ſhould be emptied two or three times a day, into a large cloth of coarſe linen, in which the hops ſhould be immediately ſtitched up with ſkewers, and carried directly to the oaſt, or kiln, to be dried; for if they remain long in the bin, or cloth, they will ſweat and be diſcoloured; but if you cannot dry them immediately, and muſt keep them a little while, ſpread them on a floor, and by that means the damage which they will receive in a day or two will not be great.

In drying of hops, firſt lay the hair-cloth very even on the bed or floor of the kiln, and ſpread the green hops thereon, about ſix inches thick, laying them with a rake as ſmooth as poſſible, not thicker in one place than another. Let the kiln be moderately warmed before you lay on the hops; then keep an even

even and ſteady fire under them, but not too fierce at firſt, for fear of ſcorching them; and let not the fire ſlacken, but rather increaſe it, till the hops are nearly dried, leſt the moiſture or ſweat, which the fire has raiſed, fall back and diſcolour the hops. After the hops have lain thus about ſeven, eight, or nine hours, have left off ſweating, and leap up when beaten with a ſtick, then turn them upſide down with a broad malt ſhovel, or ſcoop made for that purpoſe, or caſt them up into a heap in the middle, and afterwards ſpread them equally on all ſides. Let them remain in this ſituation for two or three hours more, till every hop, if poſſible, be thoroughly and equally dried; and then with a hair-cloth, remove them to the heap where they are to lie till they are bagged.

Hops break all to a powder if they are bagged hot from the kiln. To prevent this, they ſhould be laid in a heap, to ſweat and grow tough; and if they are then covered for a while cloſe with blankets, to keep the air from them, they will bag the better. There is no limited time for their ſweating; that varying according to the weather, three or four days are commonly ſufficient; but it is a certain rule, that when the hops feel moiſt and clammy, and can be ſqueezed in the hand, or trodden cloſe, without breaking, they are then fit for bagging. The harder they are trodden, the better they will keep.

The bags proper for this occaſion are made of coarſe linen cloth. They are commonly about eleven feet long, and near two yards and a half in circumference, and contain about two hundred and a half weight of hops. The ſmall bags, called pockets, contain about half that weight.

The manner of bagging is thus: make a round or a ſquare hole, but a round one is moſt convenient, about twenty-ſix or thirty inches over, in the floor of the chamber where the hops are laid in heaps after they are ſweated. This hole ſhould be large enough to receive the bag, and for a man to go up and down it with eaſe. Tie with a piece of packthread a handful of hops in each lower corner of the bag, to ſerve as handles for the more eaſy lifting or removing of the bag; and, with packthread, faſten the mouth of the bag to a frame, or hoop, ſomewhat larger than the mouth of the hole, that the hoop may reſt on its edges, and ſtrong enough to bear the weight of the hops when the bag is full, and of the man who treads them. The upper part of the bag being thus fixed by the hoop, let the reſt of it hang down through the hole; but not ſo near to the lower floor as to touch the ground: then throw into it a buſhel or two of hops; and let a man go into the bag, and with ſhoes that have no heels, tread the hops down on every ſide, as hard as he can, till they lie cloſe. Let more hops be then caſt into the bag, and be trodden down, as before; and continue this till the bag is full. When that is done, untie it from the hoop, let it down, and ſew up its mouth as cloſe as you can, obſerving at the ſame time to tie up ſome hops in the upper corners, as was done before in the lower.—The harder the hops are preſſed, and the cloſer and thicker the bag is, the longer and better the hops will keep.

HOPPER, a kind of baſket wherein the ſeed-corn is carried at the time of ſowing. See the article SOWING.

It is alſo uſed for the wooden trough in a mill, into which the corn is put to be ground. See the article MILL.

HORARY, ſomething relating to an hour: hence

HORARY, or HOUR-CIRCLE *of a Globe*, is a ſmall brazen circle, fixed upon the brazen meridian, divided into twenty-four hours, having an index moveable round the axis of the globe, which upon turning the globe fifteen degrees, will ſhew what places have the ſun an hour before or after us. See GLOBE.

HORARY CIRCLES, or LINES, in dialling, are the lines or circles which mark the hours on the ſun-dials. See DIAL.

HORARY MOTION *of the Earth*, the arch it deſcribes in the ſpace of an hour, which is nearly fifteen degrees, though not accurately ſo, as the earth moves with different velocities, according to its greater or leſſer diſtance from the ſun. See EARTH.

HORD, in geopraphy, is uſed for a company of wandering people, who have no ſettled habitation, but ſtroll about, dwelling in waggons, or under tents, to be ready to ſhift as ſoon as the herbage, fruit, and the preſent province is eaten bare: ſuch are ſeveral tribes of the Tartars, particularly thoſe who inhabit beyond the Wolga, in the kingdom of Aſtracan and Bulgaria.

A hord conſiſts of fifty or ſixty tents, ranged in a circle, leaving an open place in the middle. The inhabitants of each hord uſually form a military company or troop, the eldeſt of which is commonly the captain, and depends on the general or prince of the whole nation.

HORDEOLUM, *Crithe*, or *Barley-Corn*, ſo called from its reſemblance to that grain, in medicine, a tumour that grows in different parts of the eye-lids; it is commonly called a ſtye. When it is ſmall, it comes only on the edge of the eye-lids, or very near it between the cilia; but when it is larger, it ſpreads towards the middle of the lid. In their beginning, an inflammation commonly accompanies theſe tumors: when they do not ſuppurate, their matter is concreted, and they become wens, which are ſometimes ſoft and ſometimes very hard. Sometimes this diſeaſe diſappears a while, and afterwards returns in a few days.

The cure of this diſeaſe is ſuited to the different circumſtances that attend it. If there be an inflammation, the pulp of a roaſted apple applied by way

of poultice, ſoon diſperſes it, and ſometimes only abates the tumor. If it hardens, it muſt be opened with a lancet, and the hard fleſh conſumed by a liquid cauſtic, and afterwards the plaſter of the abbot de Grace applied.

If the hordeolum comes on the lower eye-lid, it is generally more on the inſide than the outſide, and is cured by the lapis infernalis, or rather by making an inciſion therein, drawing out the tumor and applying a collyrium of ten parts of water to one part of ſpirit of wine.

There are other little tumors on the edges of the eye-lids, which by reaſon of their whiteneſs and hardneſs are called chalazæ; as alſo another ſort, called lithiaſis or gravel-ſtone. All which are cured in the ſame manner.

HORDEUM, barley. See BARLEY.

HOREHOUND, *Marubium*, in botany. See MARUBIUM.

HORIZON, in aſtronomy, a great circle of the ſphere, dividing the world into two hemiſpheres, the one upper and viſible the other lower and inviſible.

The horizon is either rational or ſenſible.

Rational, *True*, or *Aſtronomical* HORIZON, called generally the horizon, is a great circle, whoſe plane paſſes through the center of the earth, having the zenith and nadir for the poles thereof. It divides the ſphere into two equal parts, or hemiſpheres.

The meridian and vertical circles all cut the rational horizon at right angles, and into two equal parts.

Senſible, *Viſible*, or *Apparent* HORIZON, is a leſſer circle of the ſphere: this circle divides the viſible part of the ſphere from the inviſible, and has for its poles the zenith and nadir; conſequently the ſenſible horizon is parallel to the rational; and it is cut at right angles, and into two equal parts, by the verticals.

HORIZON, in geography, is a circle paſſing over the earth, and dividing the viſible part of the earth and heavens from that which is inviſible.

The altitude or elevation of any point of the ſphere, is an arch of a vertical circle, intercepted between it and the ſenſible horizon.

This is peculiarly denominated the ſenſible horizon, to diſtinguiſh it from the rational, or true, which paſſes through the center of the earth, as already obſerved.

F. Lavel, profeſſor of hydrography at Marſeilles, found that the arch of the circumference of the earth intercepted between the obſervatory to the ſeaward and the horizon, fluctuated between fifteen minutes and thirteen minutes and a half: whence M. Caſſini deduces that the extent of the horizon is ſeven French leagues, of three miles each; and that the obſervatory is 175 feet hight.

HORIZONTAL, ſomething relating to the horizon; or that is taken in, or on a level with the horizon: thus we ſay, an horizontal plane, &c.

HORIZONTAL DIAL, that drawn on a plane parallel to the horizon, having its ſtyle elevated according to the altitude of the pole, in the place it is deſigned for. See the article DIAL.

HORIZONTAL DISTANCE. See the article DISTANCE.

HORIZONTAL LINE, in perſpective, a right-line drawn through the principal point parallel to the horizon; or it is the interſection of the horizontal and perſpective planes. See the article PERSPECTIVE.

HORIZONTAL PARALLAX. See PARALLAX.

HORIZONTAL PLANE, that which is parallel to the horizon of the place, or nothing inclined thereto.

The buſineſs of levelling is to find whether two points be in the horizontal plane, or how much the deviation is.

HORIZONTAL PLANE, in perſpective, a plane parallel to the horizon paſſing through the eye, and cutting the perſpective plane at right angles.

HORIZONTAL PROJECTION. See the articles PROJECTION and MAP.

HORIZONTAL RANGE, or *Level Range*, of a piece of ordnance, is the line it deſcribes when directed parallel to the horizon.

Dr. Halley has given us the two following uſeful theorems:

1. A ſhot being made on an inclined plane, having the horizontal diſtance of the object it ſtrikes, with the elevation of the piece, and the angle at the gun between the object and the perpendicular, to find the greateſt horizontal range of that piece loaded with the ſame charge of powder, that is, half the latus rectum of all the parabolas made with the ſame impetus.—Take half the angle contained between the object and nadir, and the difference of the given angle of elevation from that half; ſubtract the verſed ſine of that difference from the verſed ſide of the angle made by the object and zenith: the difference of thoſe verſed ſines will be to the ſine of the angle laſt mentioned, as the horizontal diſtance of the object ſtruck to the greateſt range at forty-five degrees.

2. Having the greateſt horizontal range of a gun, the horizontal diſtance and angle of inclination of an object to the perpendicular, to find the two elevations neceſſary to ſtrike that object.—Take half the angle contained between the object and nadir, this half is equal to half the ſum of the two angles of elevation ſought; then ſay, as the horizontal range is to the horizontal diſtance of the object, ſo is the ſine of the angle of inclination to a fourth proportional; which fourth, being ſubtracted from the verſed ſine of the angle formed by the object and zenith, leaves the verſed ſine of half the difference of the angles of elevation, whoſe half ſum was before

obtained; therefore, by adding and ſubtracting half the difference of the angles of elevation to and from the ſaid half ſum, the elevations themſelves will be found. See the article PROJECTILE.

HORIZONTAL REFRACTION. See the article REFRACTION.

HORMINUM, clary, in botany. See CLARY.

HORN, *Cornu*, in phiſiology, a hard ſubſtance growing on the heads of divers animals, particularly the cloven-footed quadrupeds; and ſerving them both as weapons of offence and defence.

HORN is alſo a muſical inſtrument of the wind kind, chiefly uſed in hunting, to animate the hunters and the dogs, and to call the latter together.

The French-horn is bent into a circle, and goes two or three times round, growing gradually bigger and wider towards the end, which in ſome horns is nine or ten inches over.

HORN, in architecture, ſometimes denotes a volute. See VOLUTE.

HORNS *of Inſects*, the ſlender oblong bodies projected from the heads of thoſe animals, and otherwiſe called antennæ, or feelers.

HORNBEAM, *Carpinus*, in botany, a genus of plants producing male and female flowers, which are apetalous; the male flowers are arranged into a cylindrical amentum, and the female are diſpoſed in the ſame form; there is no pericarpium, but the amentum growing very large, contains, at the baſe of each ſquamula, an oval angulated nut.

The common hornbeam grows in many parts of England, and will thrive upon the moſt cold, barren, and expoſed hill, where few others will grow. It is beſt raiſed from ſeeds, which ſhould be ſown in autumn ſoon after they are ripe, and afterwards treated as other foreſt trees. The leaves of this ſort remain on the tree till ſpring, ſo that they afford much ſhelter for the birds in winter; and this renders them very proper to be planted round the borders of other plantations in expoſed ſituations, where they will defend the other trees in winter, and thereby greatly promote their growth.

The timber of this tree is very tough and flexible, and therefore might be converted to many uſeful purpoſes, when ſuffered to grow to a proper ſize: the principal uſes it has hitherto been applied to is turnery ware, for which it is excellent; and alſo for mill-cogs, beetle-heads, &c.

HORN-WORK, in fortification, a ſort of outwork, advancing towards the field, to cover a curtain, baſtion, or other place ſuſpected to be weak, as alſo to poſſeſs an eminence, &c.

It conſiſts of two demi-baſtions joined by a curtain; its flanks are uſually parallel, though, ſometimes, they contract towards the place, forming a queue d'yronde, or ſwallow's tail. When the flanks are too long, ſometimes epaulements are made to flank them. The parts next the country are to be defended by a parapet. Two horn-works joined together make a crown-work.

HORNET, *Crabo*, in zoology, a ſpecies of apis with a black thorax, and double black ſpots on the ſegments of the body. See the article APIS.

HOROGRAPHY, the ſame with dialling. See the article DIAL.

HOROLOGIUM, a general name for inſtruments to meaſure the hours, as a watch, clock, dial, &c. See the articles WATCH, CLOCK, &c.

HOROPTER, in optics, a right line drawn through the point where the two optic axes meet, parallel to that which joins the centers of both the eyes.

HOROSCOPE, in aſtrology, the point of the heavens riſing above the eaſtern point of the horizon, at any given time when a prediction is to be made of a future event; as the fortune of a perſon then born, the ſucceſs of a deſign, &c.

It alſo denotes a figure of the twelve houſes, or twelve ſigns of the zodiac, wherein the diſpoſition of the heavens is marked for the time given.

Lunar HOROSCOPE, the point from whence the moon proceeds when the ſun is in the aſcending point of the eaſt.

HORSE, *Equus*, in zoology, a well known quadruped, the characters of which are theſe: the fore-teeth are ſix in number, the upper ones incurvated, and the inferior prominent: the canine teeth are not exerted, and are on each ſide ſeparated by a ſpace from the teeth: the hoof is undivided, and the teats are two, and placed in the groin.

The horſe is one of the nobleſt quadrupeds we are acquainted with. In ſtrength and natural fierceneſs, he is inferior to few, and yet eaſily tamed. The head is long and large; the eyes large and prominent; the ears erect and beautiful; the neck is long and thick, and elegantly decorated with a mane; the body is rounded and beautifully turned; the legs are ſtrong, without being bulky; and the tail is long, and hairy all the way; the hairs being like thoſe of the mane, only longer, thicker, and more beautiful.

Though the moſt experienced horſemen are not always agreed in ſome points relating to the ſhape, make, and goings of a horſe, yet they almoſt always accord in this, that there ought to be a juſt proportion in all his parts. That even when he is taken to pieces, and examined ſingly in his particular members, though ſome defects may appear, yet when they all bear a juſt correſpondence one to another, and concur in ſuch a manner as to render his action eaſy, juſt, and regular, ſuch a horſe cannot be greatly diſagreeable, but will, for the moſt part, move well, and with a tolerable good grace. On the other hand, ſuppoſe a horſe has ſome parts exquiſitely fine, and others indifferent, which frequently happens, it will mar his beauty, and cauſe him

him to look disagreeable, and for the most part affect his gait and action.

In order to have a horse beautiful and finely made, it has been agreed on all hands, that his head should not be long nor too large, rather lean than fleshy; his ears thin and narrow, and of a becoming length, well set on, pointing inwards; his brow or forehead not too broad and flat; his nose somewhat rising, and of a good turn; his nostrils wide and thin; his muzzle small; his mouth neither deep nor too shallow; with a star or snip down his forehead, or a blaze, which is no way unbecoming, unless it be too large and disproportioned.

Horses that are thus marked, have generally one or more of their feet white, which is also very beautiful, and looks lively. His jaws should be thin and sufficiently wide, not approaching too near together, nor too high upwards towards the onset, that he may have sufficient room to carry his head easy, and in good place; his eyes well formed, sprightly, and of a middle size; his neck should be arched towards the middle, arising by a beautiful gradation out of his breast and shoulders, the muscles thereof distinct, but no where overcharged with flesh, growing smaller and thinner as it approaches towards his head; his shoulders should be thin from the withers, with a gradual enlargement downwards, that his bosom or breast be not too narrow nor too gross; his fore-legs straight and well placed; his joints lean and bony; his knees not bending, and his pasterns not too long; his feet round and smooth, and his sinews firm and well braced; his carcase rather round than flat; his back not too low, and for strength and durableness pretty even and straight; his ribs rather home than open, as they approach towards his haunches; his buttocks round, and the muscles not too fleshy, but distinct; his hocks or gambrels neither standing too wide nor too near together; his hocks should be lean and no wise puffed or fleshy; his pasterns short, his legs flat and thin; and his tail set on in a good place, rather high than low, rising upon every motion of his body. The more these properties concur in any horse, the more beautiful he must be, especially when they correspond and agree in due proportion, one to another; and the more a horse is wanting in these, the more plain an ordinary he will appear.

HORSE-CHESNUT, *Æsculus*, in botany, a tree with digitated leaves; the flowers grow in beautiful spikes, and come out in May, each consisting of five roundish petals, with narrow ungues inserted in the cup: the stamina are seven subulated filaments topped with rising antheræ: the fruit is a coriaceous roundish capsule beset with spines, opening with three cells, in which are contained one or two globular nuts, of a bright mahogany colour.

This tree was formerly planted in avenues: the grandest we know of is in Bushy-Park; but they have a much better appearance when planted singly, as the natural growth of them is obtusely pyramidical, the under branches being always greatly extended, and the succeeding ones gradually decreasing to the top.

It is propagated by planting the nuts early in the spring, and afterwards managed like the common chesnut, observing, in transplanting them, not to shorten any of the branches.

Horse-chesnut trees were originally brought from Constantinople to England; and although they are natives of so warm a climate, yet they resist the cold of the severest winters we have here, and grow to be very large.

The fruit of this tree is very bitter, and the only use they are applied to here, is to feed deer, who are very fond of them; so that in large parks it is very proper to have a number of horse-chesnut trees, as they are not only ornamental but useful.

HORSE-DUNG, in gardening, is of particular use for hot-beds; whereby cucumbers, melons, asparagus, sallads, and other delicacies, are attained early in the spring; for which purpose no other sort of dung will do so well, if mixed with litter and ashes, as this; and when rotten will make a good manure for cold lands.

HORSE-RADISH, a well known species of cochlearia; it is propagated by cuttings or buds from the sides of the old roots; the season for this work is in October or February, the former for dry lands, and the latter month for wet: the ground where they are designed to be planted should be well trenched and broke, after which a trench should be made a foot deep, in the bottom of which the sets should be placed with their buds upwards, at about four or five inches asunder, covering them with the earth which comes out of the next trench, and so continuing on till the intended piece of ground is finished. The second year the roots will be fit for use.

HORSE-SHOE, in fortification, is a small work sometimes of a round and sometimes of an oval figure, inclosed with a parapet, sometimes raised in a moat or ditch, or in low grounds, and sometimes to cover a gate, or to serve as a lodgment for soldiers.

HORSE-SHOE-HEAD, a disease in infants, in which the sutures of the skull lie too open.

This is commonly a sign of a weak constitution, and a short life. The nurses usually embrocate the parts affected with brandy or rum, to which some add the white of an egg, or palm oil.

HORSE-TAIL, in botany. See EQUISETUM.

HORSE, in a military sense, the same with cavalry. See the article CAVALRY.

The light-horse, in an army, are all the regiments of horse, except the guards.

HORSE, among seamen, a rope fastened to the yards in two places, for the men to tread on, and secure

ſecure themſelves by, as they go out on the yard-arms to furl, reef, or looſen the ſails.

HORSE is alſo a rope drawn very tight perpendicularly cloſe to the maſt to hoiſt ſome ſail upon, as the try-ſail of a ſnow, the ſquare-ſail of a ſchooner, &c.

HORSE is likewiſe a name given by ſeamen to a ſhort reed thruſt into the bung of a caſk, or keg, to draw off brandy, gin, &c.

HORTICULTURE, the ſame with gardening. See GARDEN and GARDENING.

HORTUS SICCUS, a dry-garden, an appellation given to a collection of ſpecimens of plants carefully dried and preſerved.

HOSANNA, in the Hebrew ceremonies, a prayer which they rehearſed on the ſeveral days of their feaſt of tabernacles.

The word is Hebrew, and literally ſignifies *ſave us now*, or, *ſave us, we pray*.

HOSE, in commerce. See the article STOCKING.

HOSEA, a canonical book of the Old Teſtament, ſo called from the prophet of that name, its author, who was the ſon of Beri, and the firſt of the leſſer prophets. He lived in the kingdom of Samaria, and delivered his prophecies under the reign of Jereboam II. and his ſucceſſors, kings of Iſrael, and under the reigns of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah. His principal deſign is to publiſh the groſs idolatries of the people of Iſrael and Judah, to denounce the divine vengeance againſt them, and to foretel the captivity in Aſſyria.

HOSPITAL, a place or building properly endowed, or otherwiſe ſupported by charitable contributions, for the reception and ſupport of the poor, aged, infirm, ſick, or helpleſs.

Camp-HOSPITALS are either general or regimental. The general hoſpitals are of two kind, viz. the flying hoſpital, attending the camp at ſome convenient diſtance; and the ſtationary hoſpital, which is fixed at one place. In the choice of both, Dr. Pringle thinks it better to have them in towns than villages, as the former will afford larger wards, beſides more of other conveniencies. Theſe wards ſhould be as airy as poſſible. Regimental hoſpitals are of the greateſt importance, and therefore ſhould be ſupplied with blankets and medicines from the public ſtores, with an allowance alſo for nurſes and other neceſſaries. Barns, ſtables, granaries, and other out-houſes, but above all, churches, make the beſt hoſpitals from the beginning of June to October.

HOSPITAL-FEVER, a name given to a malignant catarrhal fever, as being frequent in hoſpitals. See the article MALIGNANT FEVER.

HOSPITALLERS, an order of religious knights, now known by the title of the knights of Malta. See the article MALTA.

HOST, *Hoſpes*, denotes either a perſon who entertains another, or the perſon ſo entertained; but it is now generally uſed in the firſt of theſe ſenſes.

HOST, or HOAST, *Hoſtia*, in the church of Rome, a name given to the elements uſed in the euchariſt, or rather to the conſecrated wafer; which they pretend to offer up every day, a new hoſt or ſacrifice, for the ſins of mankind.

HOSTAGE, a perſon given up to an enemy as a ſecurity for the performance of the articles of a treaty.

HOSTILITY denotes a ſtate of war or enmity between two nations.

During a truce all acts of hoſtility are to ceaſe on both ſides.

HOT-BATH. See the article BATH.

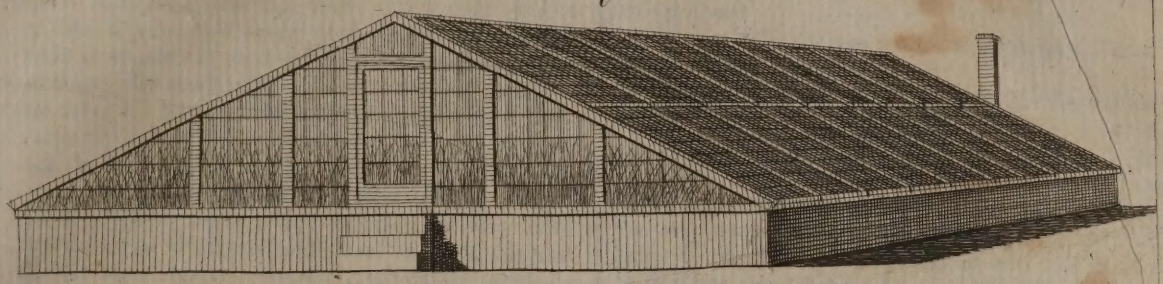
HOT-BEDS, in gardening, beds made with freſh horſe-dung, or tanners bark, and covered with glaſſes to defend them from the cold winds.—By the ſkilful management of hot-beds we may imitate the temperature of warmer climates, by which means the ſeeds of plants brought from any of the countries within the torrid zone may be made to grow and flouriſh. Beds made of horſe-dung are proper to make the ſeeds of different plants to come up ſoon, particularly thoſe that require a very ſtrong heat; but as this heat is not ſo permanent as that of tanners bark, the laſt mentioned is to be preferred. As to the method of making hot-beds, it is better ſeen than deſcribed, as is likewiſe the management of them.

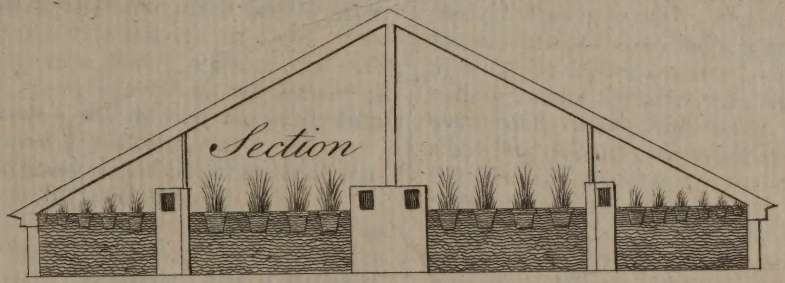
HOT-HOUSE, in ſalt-making, the place where they dry the ſalt, when taken out of the boiling pan: it is ſituated near the furnace, which, by means of funnels or tubes, conveys a heat into it.

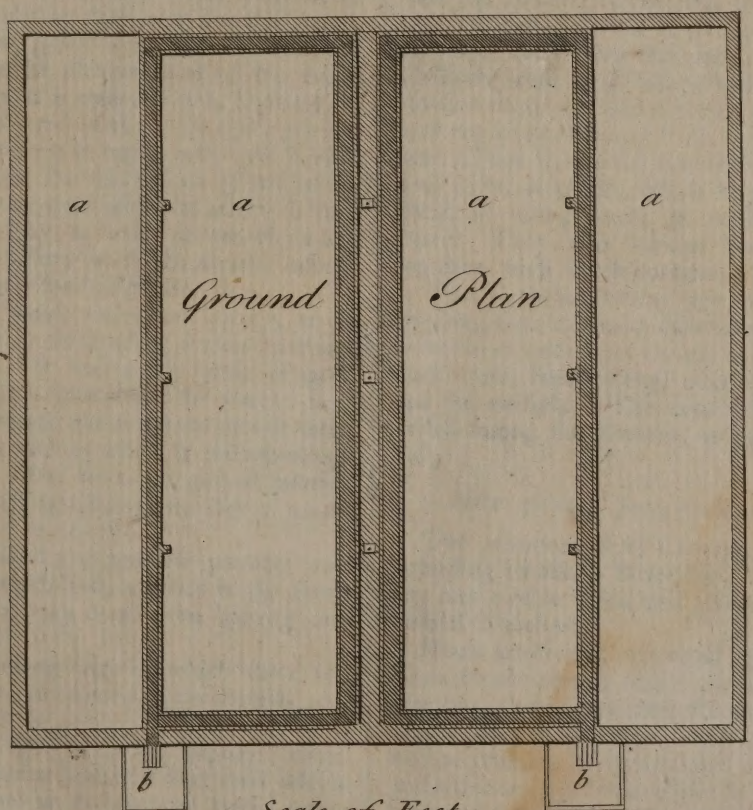
HOT-HOUSE, or ſtove, in gardening, a conſervatory for the preſervation of tender exotic plants. In plate LXII. is exhibited a view of a hot-houſe peculiarly adapted for raiſing and bringing to perfection the ananas, or pine-apple. In the ground plan *a a a a*, are four pits for containing the bark, in which the plants are plunged; the two middle pits are for fruiting plants, the other two may be uſed for ſmall plants called Succeſſion, or, if not, they are well adapted for melons: *b b* are the fire places, covered with ſheds; the dark parts round the two inner pits repreſent the flues which terminate at the chimneys built over the fire places. The ſection and perſpective view are ſo obvious that they require no references, as the ſcale will determine all the parts.

As this conſtruction ſeems to be out of the common way of building of hot-houſes, it may therefore be objected to; but we can ſee but little inconvenience in it; and as to the conveniency attending the welfare of the plants, we think it better than thoſe built in the common forms; for, in the firſt place, this will have the morning ſun ſooner, and the evening ſun later, than the other ſort, and likewiſe

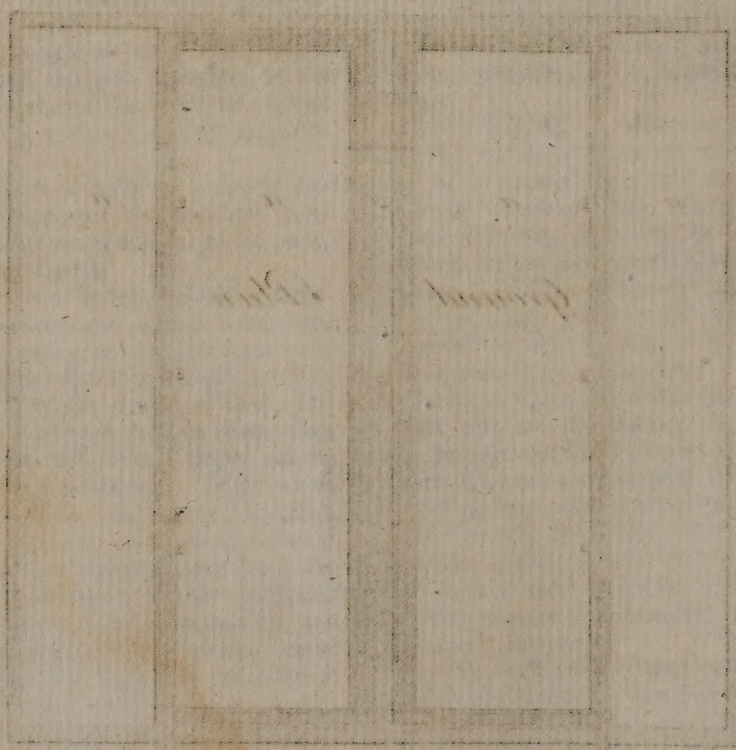
A Perspective View of a Hothouse.







J. Lodge Sculp.



likewiſe the mid-day ſun; and although the rays at that time will fall obliquely, we think it of ſervice in very hot days, at which times the common ſtoves are obliged to be ſhaded, to prevent the plants from being burnt, but in this conſtruction it is not neceſſary: alſo in winter, when the ſun iſſues but little warmth except at noon, then the upright glaſſes in front receive the rays almoſt perpendicularly; whereas in the common ſtoves the obliquity of the glaſſes render the rays inefficacious, being of no other uſe but to tranſmit light. Another conveniency attends this new form, that is, the air can be admitted at either ſide, according to the wind, or both, in very hot weather, which cannot be done by the other; and likewiſe in very cold weather, the windward ſide can be kept covered (either with canvas or ſhutters, which are neceſſary for both on nights) while the other ſide is open, it will therefore have both warmth and light. We muſt therefore be of a ſtrong opinion, that this conſtruction, if put in execution, will anſwer all the purpoſes intended, and ſhall remain in the ſame mind till it is proved to the contrary.

For a plan and deſcription of one of the beſt common hot-houſes ſee the article STOVE.

HOTCH-POT, in law, is uſed for mixing of lands given in marriage with other lands in fee which fall by deſcent; as where a man poſſeſſed of thirty acres of land has iſſue only two daughters, and after his having given with one of them ten acres in marriage, he dies poſſeſſed of the other twenty: here ſhe that is thus married, in order to gain her ſhare of the reſt of the land, muſt put her part given in marriage in hotch-pot; that is, ſhe muſt refuſe to take the ſole profits of her lands, and cauſe it to be mingled with the other, ſo that an equal diviſion may be made of the whole between her and her ſiſter; by which means, inſtead of only her ten acres, ſhe has fifteen.

HOTTONIA, water violet, in botany, an aquatic plant, growing in ſtanding waters in many parts of England; the leaves are finely winged, the flower-ſtalks riſe a little above the water; they are naked, and towards the top have two or three whorles of flowers, each of which is monopetalous and ſaucer-ſhaped. The fruit is a globoſe pointed capſule, with one cell containing a number of round ſeeds.

HOTTS, or HUTTS, are the pounces and round balls of leather, ſtuffed, and tied to the ſpurs of fighting cocks, to keep them from hurting one another in ſparring.

HOUND, a hunting dog, of which there are ſeveral ſorts, as the grey-hound, gaze-hound, and the blood-hound.

HOUNDS *of the Maſt*, in the ſea-language, thoſe parts of the upper-end or head of a maſt upon which the cheeks are bolted to ſupport the truſſel-trees. See the articles MAST and TRUSSEL-TREES.

HOUR, *Hora*, a meaſure of time, ſome part of a natural day, uſually a twenty-fourth and twelfth, &c. With us it is equal to the twenty-fourth part of the earth's diurnal rotation. Each hour is divided into ſixty minutes, and each minute into ſixty ſeconds, &c. Fifteen degrees of the equator anſwer to an hour.

The word is derived from the Latin *hora*, which ſignifies the ſame thing.

The ancient Hebrews did not divide the day into hours, but into four parts, as morning, high-day or noon, midnight, and morning watch. In the New Teſtament we find the day divided into twelve hours; but though they were equal to each other, yet they were unequal with reſpect to the different ſeaſons: thus the twelve hours of the longeſt day in ſummer were made longer than thoſe of the ſhorteſt days in winter. Herodotus ſays, that the Greeks learned from the Egyptians the method of dividing the day into twelve parts, the riſe of which cuſtom among the latter was, becauſe their prieſts were wont, twelve times a day, to cry aloud with a howling noiſe to their cynocephalus; and Cicero and Marius Victorinus have taken notice of ſuch a ceremony to Serapis.

Cenſorinus obſerves, that the word hour was not known among the Romans three hundred years after the building of the city, as there is no mention made of it in the twelve tables, as is done in the other laws after that time; before which, the diviſions were only before and after noon. The diviſion of the day and night into twenty-four hours was not known among them before the firſt Punic war. They divided the twelve hours of the day into four parts, as prime, which began at ſix o'clock; third, at nine; ſixth, at twelve; and ninth, at three. They alſo divided the night into four watches, each watch containing three hours.

The Turks not having any clocks, their prieſts, ſtopping their ears with their fingers, proclaim with a very loud voice from the top of their moſques, the cock-crow, break of day, noon-tide, three o'clock, and the twilight. The ſame cuſtom we find prevailed among the Romans, as appears from Martial;

Horas quinque, puer, nondum tibi nunciat.

The aſtronomers of Cathaya, &c. ſtill retain, according to biſhop Beveridge, the diviſion of the day into twelve parts, and give the name of ſome animal to each hour.

Hours are divided into equal and unequal; equal hours are the twenty-fourth part of a day and night preciſely, that is, the time when 15° of the equator mount above the horizon; they are alſo called equinoctial hours, as being meaſured on the equinoctial; and aſtronomical, becauſe uſed by aſtronomers, and reckoned from noon in a continued ſeries of twenty-four.

HOUSE, *Domus*, a habitation, or place built with conveniencies for dwelling in: thus we ſay, a town-houſe, country-houſe, &c.

HOUSE-BOTE, in law, an allowance of timber out of the lord's woods, for the repairs of a houſe: this is otherwiſe called eſtovers.

HOUSE, in aſtrology, denotes the twelfth part of the heavens.

HOUSE-BREAKING, or ROBBING, is the breaking into and robbing a houſe in the day-time; the ſame crime being termed burglary, when done by night; both are felony, without benefit of clergy.

Green-HOUSE. See the article GREEN-*Houſe*.

HOUSE-LEEK, ſedum, in botany. See the article SEDUM.

HOUSING, among bricklayers, a term uſed for a tile or brick that is warped, or caſt crooked or hollow in burning.

Tiles are apt to be houſing or hollow on the ſtruck ſide, or that which was uppermoſt in the mould, and bricks on the contrary ſide.

HOUSTONIA, in botany, a genus of plants whoſe flower is monopetalous and funnel-ſhaped, with four ſtamina. The fruit is a roundiſh bivalvular capſule, with two cells, each containing a ſingle ſeed.

HOWKER, in the Dutch marine, a veſſel with two maſts, uſed in the coaſting trade.

HUCKSTER, a perſon who ſells proviſions, or ſmall ware, by retail.

HUE AND CRY, in law, the purſuit of a perſon who has committed felony on the highway.

If the party robbed, or any in the company of a perſon either robbed or murdered, go to the conſtable of the next town, and require him to raiſe hue and cry, and to purſue the offender, deſcribing him, and giving an account as near as he can, of the courſe he ſteered; the conſtable is immediately to call upon the pariſh for aid in ſeeking after the felon; and if he cannot be found within the bounds of that pariſh, then he is to give the next conſtable warning; and he the next, till the offender be apprehended, or at leaſt purſued to the ſea ſide. If perſons are not ready at the ſummons of the ſheriff, and cry of the county, to engage in the purſuit, they may be fined: and in caſe the inhabitants of any hundred, after hue and cry is made, neglect to purſue the ſame, they ſhall be liable to pay one half of the damages recoverable againſt the hundred in which the robbery was committed.

HUGONIA, in botany, a genus of plants, whoſe flower conſiſts of five large roundiſh patent petals, with ten ſubulated filaments topped with twin antheræ. The fruit is a globoſe drupe, containing a hard ſtriated nut.

HUGUENOTS, a name given by way of contempt to the Calviniſts of France.

The name had its riſe in the year 1560; but authors are not agreed as to its origin. The moſt plauſible opinion, however, is that of Paſquier, who obſerves, that at Tours, the place where they were firſt thus denominated, the people had a notion, that an apparition or hobgoblin, called king Hugon, ſtrolled about the ſtreets in the night-time; from whence, as thoſe of the reformed religion met chiefly in the night to pray, &c. they called them Huguenots; that is, the diſciples of king Hugon.

HULK, in the marine, an old ſhip of war properly fitted with a very high maſt, firmly ſupported by various props and ſhrouds, to hoiſt in and out the maſts of other men of war occaſionally; alſo an old ſhip of any kind.

HULL, in ſhip-building, the hull or lower frame of a ſhip, excluſive of the ſuperſtructure, viz. the maſts, ſails, and rigging.

HULL-TO, the ſituation of a ſhip lying-to at ſea, without any ſail ſet. See the article TRYING.

HUMAN, in general, is an appellation given to whatever relates to mankind: thus we ſay, the human ſoul, human body, human laws, &c. See the articles SOUL and BODY.

HUMANITY, the peculiar nature of man, whereby he is diſtinguiſhed from all other beings. See the article MAN.

HUMANITIES, in the plural, ſignify grammar, rhetoric, and poetry, known by the name of *literæ humaniores*; for teaching of which, there are profeſſors in the univerſities of Scotland, called humaniſts. See the articles GRAMMAR, RHETORIC, &c.

HUMBLE-BEE, the Engliſh name of ſeveral ſpecies of apis, diſtinguiſhed by their colours, black, tawny, reddiſh, &c. See the article APIS.

HUMECTATION, in pharmacy, the moiſtening or preparing medicines by ſteeping them in water; either to ſoften and relax their ſolid parts, or to prevent the evaporation of their more ſubtile contents.

HUMERUS, in anatomy, the upper part of the arm between the ſcapula and elbow.

The os humeri or brachii, as it is called, is articulated at one end with the ſcapula, and at the other end to the ulna and radius. See the articles ARM, BRACHIUM, &c.

As to the motion of the os humeri, it is evidently the moſt free and extenſive of that of any bone in the human body; being furniſhed with ſeveral flexor and extenſor muſcles. See the articles FLEXOR and EXTENSOR.

HUMIDITY, that quality in bodies whereby they are capable of wetting other bodies. This differs very much from fluidity, and ſeems to be merely a relative thing depending upon the congruity of the component particles of the liquor to the pores of ſuch particular bodies, as it is capable of adhering to, penetrating a little into, or wetting.

HUMIDUM RADICALE, or *Radical Moiſture*,

among phyſicians, ſeems to amount to no more than the pureſt and moſt delicate part of the nutritious matter in a condition to be aſſimilated.

By too much heat, as in fevers, hectics, &c. this humidity is too haſtily exhauſted and ſpent.

HUMILIS MUSCULUS, one of the depreſſor-muſcles of the eye.

HUMMING-BIRD, *Trochilus*, in ornithology, a genus of birds, of the order of the paſſeres, remarkable for being the ſmalleſt of all known birds. Their beak is of a ſubulated figure, but fine as a thread: it is longer than the head, and not perfectly ſtrait: add to this, that they have a fine tube or pipe, which they can extend beyond the point of the beak. Of this ſingular genus, there are ſeveral elegant ſpecies.

HUMORISTS, *Gli Humoriſti*, a celebrated academy of learned men at Rome, firſt eſtabliſhed by Paul Mancini. The device of this academy is a cloud; which being raiſed on vapours from the ſalt-water of the ſea, returns again freſh, with this hemiſtich from Lucretius, *Redit agmine dulci*.

HUMOROSI, the name of another academy at Cortona in Italy, which muſt not be confounded with that of the Humoriſts.

HUMOUR, *Humor*, in a general ſenſe, denotes much the ſame with liquid or fluid. See the article FLUID.

The ancients ſeem to have called the nutritious juices the radical humour; and to have conſtituted as a cauſe of diſeaſes, a diſproportion betwixt the innate heat and radical moiſture or humour. They alſo made four humours in the blood. See the article BLOOD.

HUMOURS *of the Eye*, are the cryſtalline, vitreous, and aqueous; for a deſcription of which, ſee the articles EYE, CRYSTALLINE, &c.

HUMOUR is alſo uſed for the peculiar temper of a perſon, ariſing from the conſtitution and prevalence of this or that humour. See the articles CONSTITUTION and TEMPERAMENT.

HUMOUR, in dramatic poetry, is eſteemed a ſubordinate ſpecies of what is more uſually called manners. See MANNERS.

Every paſſion wears two different faces; one ſerious and ſolemn, fit only for tragedy; and the other merry and ridiculous, called humour, and proper for comedy. The Engliſh poets have excelled thoſe of all other nations in this particular; and, indeed, ours is the only language that has a name for it.

To be always witty only becomes a few characters; ſo that it is neceſſary to call in the aſſiſtance of humour, to prevent the other dramatic perſons from going into the common ſtyle and manner: hence humour may be looked on as the true ſpirit and wit of comedy. See the article WIT.

HUMULUS, the hop, in botany. See the article HOP.

HUNDRED, *Centum*, *Cent.* is ten times ten, or the ſquare of ten. It makes the third place from the right to the left, in the table of numeration.

The proportion of the profits in commerce is reckoned by the hundred, or ſo much per cent.

HUNDRED, *Hundredum*, *Centuria*, a certain diviſion or part of a ſhire or county.

HUNGARICUS MORBUS, a diſeaſe ſo called from its being firſt obſerved in the imperial army, in 1556.

It is thought to have been a compound fever, partaking of the nature both of the bilious and malignant fevers. See BILIOUS and MALIGNANT.

HUNGARY-WATER, a diſtilled water, ſo denominated from a queen of Hungary, for whoſe uſe it was firſt prepared.

Quincy gives the following directions for making it:—Take of freſh gathered flowers of roſemary, two pounds; rectified ſpirit of wine, two quarts; put them together, and diſtil them immediately in balneo.

Or, Take of freſh tops of roſemary, one pound and a half; proof ſpirit, one gallon; and diſtil in balneo till five pints are obtained.

HUNGER, an uneaſy ſenſation, which creates an appetite or deſire for food. See the article FOOD.

Hunger is by ſome attributed to a ſharp acrimonious humour, which vellicates the coats of the ſtomach; others, who deny the exiſtence of any ſuch liquor, attribute it to the attrition or rubbing of the coats of the ſtomach; and others, again, account for it from the acidity of the blood.

HUNGRY EVIL, among farriers, an exceſſive deſire in horſes to eat, which ſometimes proceeds from catching cold, or from travelling long in froſt and ſnow, or through barren places.

For the cure, give him great ſlices of bread, toaſted and ſteeped in ſack, to comfort his ſtomach; or give him wheat flour in wine or milk, a quart at a time. But there is nothing better than to feed him moderately ſeveral times a day with good bean-bread well baked, or with oats well dried and ſifted.

HUNTING, the exerciſe or diverſion of purſuing four-footed beaſts of game. See the article GAME.

HUOY, a veſſel uſed to load and unload large ſhips, either in the king's or merchants ſervice; alſo a ſmall Dutch ſhip, with a main-maſt and mizen-maſt.

HURA, in botany, a genus of plants whoſe flowers are male and female, growing on the ſame plant; the male-flowers are apetalous, being an imbricated amentum, principally compoſed of cylindrical filaments, terminated with ſeſſile antheræ lying over each other: the female flower is deſtitute of a corolla, being compoſed of a ſwelling cylindrical calyx: the ſtyle is long, and terminated with a large funnel-ſhaped ſtigma: the fruit is an orbicular

ligneous

ligneous pericarpium, conſiſting of twelve cells, each containing a ſingle ſeed of a roundiſh compreſſed form.

We know only one ſpecies of this genus, which riſes with a ſoft woody ſtem, abounding with a milky juice, and furniſhed with heart ſhaped leaves indented on their edges. It grows naturally in the Weſt-Indies, where it is called the ſand-box tree, the ſhells being uſed to contain ſand for writing.

HURDLES, in fortification, twigs of willows or oſiers interwoven cloſe together, ſuſtained by long ſtakes, and uſually laden with earth.

Hurdles, called alſo clays, are made in the figure of a long ſquare; the length being five or ſix feet, and the breadth three, or three and a half: the cloſer they are woven, the better. They ſerve to render batteries firm, or to conſolidate the paſſage over muddy ditches; or to cover traverſes and lodgments, for the defence of the workmen, againſt the fire-works, or the ſtones that may be thrown againſt them.

HURDLES, in huſbandry, certain frames, made either of ſplit timber, or of hazle-rods, wattled together, to ſerve for gates in incloſures, or to make ſheep-folds, &c.

HURDS, or HORDS, *of Flax*, or *Hemp*, the coarſer parts ſeparated in the dreſſings, from the tear or fine ſtuff.

HURLE-BONE, in a horſe, a bone near the middle of the buttock, very apt to go out of its ſockets with a hurt or ſtrain.

HURRICANE, a furious ſtorm of wind, owing to a contrariety of winds. See the articles WIND and WHIRL-WIND.

HUSBAND, *Maritus*, a man joined or contracted with a woman in marriage.

HUSBANDRY, the buſineſs or employment of a farmer, or perſon who cultivates land, &c. See AGRICULTURE.

Huſbandry is divided into two kinds, and diſtinguiſhed by the epithets old and new. The former is that which has been practiſed in all countries from the moſt early times; and the latter that introduced by the ingenious Mr. Tull, and often called the horſe-hoeing huſbandry.

Experience ſhews, that land, though ever ſo well tilled in the autumn, when wheat, for example, is ſown, hardens and ſaddens in the winter; its particles, beaten down by heavy rains, and ſunk by their own weight, approach each other daily more and more; the roots of the plants cultivated have conſequently leſs and leſs room to extend themſelves in queſt of their neceſſary food; and the interſtices in the earth become of courſe ſo few and cloſe, that they are not able to pierce through them; whilſt weeds ſpring up, and rob them of their nouriſhment. By this means the earth, reduced to nearly the ſame condition as if it had not been ploughed at all, is unable to aſſiſt the plants ſown in it, in the ſpring, when they ought to ſhoot with the greateſt vigour. They conſequently then ſtand moſt of all in need of the plough, to deſtroy the weeds, to lay freſh earth to their roots in the room of that which they have exhauſted, to break the particles of the ground anew, ſo as to enable their roots to ſpread, in order to their gathering an ample proviſion of food, which then does them the greateſt ſervice.

The editors of the laſt edition of Mr. Tull's Horſe-Hoeing Huſbandry give, in their preface to that work, the following comparative calculation of the expence and profit of the old method of culture and the new, drawn up by a gentleman who has practiſed both for ſome years, and who has no attachment to the new huſbandry, farther than he has found it anſwer in his trials. They candidly appeal to experience, "whether every article in this calculation is not eſtimated in favour of the common huſbandry; whether the expence be not rated lower than moſt farmers find it; and whether the crop be not ſuch as they would rejoice to ſee, but ſeldom do.

"In the new huſbandry, every article is put to its full value, and the crop of each year is computed four buſhels ſhort of the other; though, in ſeveral years experience, it has equalled, and generally exceeded, thoſe of the neighbourhood in the old way."

An Eſtimate of the Expence and Profit of Ten Acres of Land, in Twenty years.

I. In the Old Way.

Firſt year for wheat coſts 33 l. 5 s. viz.				l. s. d.	
Firſt ploughing, at 6 s. per acre				3 0 0	
Second and third ditto, at 8s. per acre	—	—	—	4 0 0	
Manure, 30 s. per acre.	——			15 0 0	l. s. d.
					22 0 0
Two harrowings and ſowings, at 2 s. 6 d. per acre	—	—		1 5 0	
Seed, three buſhels per acre, at 4 s. per buſhel	—	—		6 0 0	
Weeding, at 2 s. per acre	—			1 0 0	
Reaping, binding, and carrying in, at 6 s. per acre	——			3 0 0	
					11 5 0
Second year for barley coſts 11 l. 6 s. 8 d.					
Once ploughing, at 6 s. per acre				3 0 0	
Harrowing and ſowing, at 1 s. 6d. per acre	——	——		0 15 0	
Seed, four buſhels per acre, at 2 s. per buſhel	—	—		4 0 0	
Weeding, at 1 s. per acre	—			0 10 0	
Cutting, raking, and carrying, at 3 s. 2 d. per acre	——			1 11 8	
Graſs-ſeeds, at 3 s. per acre	—			1 10 0	
					11 6 8
					44 11 8

Third and fourth years lying in graſs coſt nothing.			
So that the expence of ten acres in four years comes to 44 l. 11 s. 8 d. and in twenty years to	l.	s.	d.
	222	18	4
Firſt year's produce is half a load of wheat per acre, at 7 l. per acre — — — —	35	0	0
Second year's produce is two quarters of barley per acre, at 1 l. per acre	20	0	0
Third and fourth years graſs is valued at 1 l. 10 s. per acre	15	0	0
So that the produce of ten acres in four years is — —	70	0	0
And in twenty years it will be	350	0	0
Deduct the expence	222	18	4
And there remains clear profit on ten acres in twenty years by the old way — —	127	1	8

II. In the New Way.

Firſt year's extraordinary expence is,					
For ploughing and manuring the land, the ſame as in the old way — — — —				22	0 0
	l.	s.	d.		
Ploughing once more, at 4 s. per acre — — —	2	0	0		
Seed, nine gallons per acre, at 4 s. per buſhel	2	5	0		
Drilling, at 7 d. per acre —	0	5	10		
Hand-hoeing and weeding, at 2 s. 6 d. per acre — —	1	5	0		
Horſe-hoeing, ſix times, at 10 s. per acre — — —	5	0	0		
Reaping, binding, and carrying in, at 6 s. per acre	3	0	0		
The ſtanding annual charge on ten acres is — —	13	15	10		
Therefore the expence on ten acres in twenty years is —				275	16 8
Add the extraordinaries of the firſt year, and the ſum is —				297	16 8
The yearly produce is at leaſt two quarters of wheat per acre, at 1 s. 8 d. per quarter, which on ten acres in twenty years, amounts to — —				560	0 0
Therefore, all things paid, there remains clear profit on ten acres in twenty years, by the new way — — —				262	3 4

" So that the profit on ten acres of land in twenty years, in the new way, exceeds that in the old by one hundred and thirty-five pounds, one ſhilling, and eight-pence, and conſequently is conſiderably more than double thereof: an ample encouragement to practiſe a method whereby ſo great advantage will ariſe from ſo ſmall a quantity of land, in the compaſs of twenty-one years leaſe; one year being allowed, both in the old and new way of preparing the ground.

" It ought withal to be obſerved, that Mr. Tull's huſbandry requires no manure at all, though we have here, to prevent objections, allowed the charge thereof for the firſt year; and moreover, that tho' the crop of wheat from the drill-plough is here put only at two quarters on an acre, yet Mr. Tull himſelf, by actual experiment and meaſure, found the produce of his drilled wheat crop amount to almoſt four quarters on an acre: and, as he has delivered this fact upon his own knowledge, ſo there is no reaſon to doubt of his veracity, which has never yet been called in queſtion. But that we might not be ſuppoſed to have any prejudice in favour of his ſcheme, we have choſen to take the calculations of others rather than his, having no other view in what we have ſaid, than to promote the cauſe of truth, and the public welfare."

HUSK, the ſame with what botaniſts call the calyx, or cup of a flower. See the article CALYX.

HUSSARS, a kind of irregular cavalry, armed with the ſabre and bayonet, are retained in the ſervice of moſt princes on the continent.

HUSSITES, the diſciples of John Huſs, a Bohemian, and curate of the chapel of Bethlehem at Prague; who, about the year 1414, embraced and defended the opinion of Wickliff of England, for which he was cited before the council of Conſtance, and, refuſing to renounce his ſuppoſed errors, he was condemned to be burnt alive, which ſentence was accordingly executed upon him at Conſtance.

HYACINTH, hyacinthus, in botany, a genus of plants, whoſe root is bulbous, with ſmooth long leaves, which ariſe immediately from the root. The flowers are produced in ſpikes, placed alternately, each conſiſting of a monopetalous campanulated corolla, divided into ſix reflexed ſegments at the limb, with three nectariums, placed on the top of the germen. The ſtamina are ſix ſhort ſubulated filaments, topped with connivent antheræ.

The fruit is a roundiſh triquetrous, divided into three cells, each of which uſually contains two roundiſh ſeeds.

The double hyacinths, of which there are great variety, are much eſteemed for their fragrancy and beauty. They are propagated by offsets, or from ſeeds.

HYACINTH, in natural hiſtory, a genus of pellucid gems, whoſe colour is red, with an admixture of yellow.

HYACINTHIA, an ancient Grecian feſtival, obſerved at Amyclæ in Laconia, in the month Hecatombæon, in memory of the beautiful young Hyacinthus, ſon of Amyclos, king of Sparta.

HYADES, in aſtronomy, ſeven ſtars in the head of the bull, famous among the poets for bringing on rain both at the riſing and ſetting.

The work is Greek, and derived from *υω*, to rain.

The principal of them is in the left eye, by the Arabs, called Aldebaran.

HYDATIS, in medicine, a little tranſparent veſicle, or bladder full of water, which is ſometimes found ſingly, and ſometimes in cluſters, upon the liver, and various other parts, eſpecially in dropſical conſtitutions.

HYDATOIDES, the ſame with the aqueous humour of the eye. See EYE.

HYDATOSCOPY, *Hydatoſcopia*, called alſo HYDROMANCY, in antiquity, a kind of divination, or method of foretelling future events by means of water.

The word is Greek, and formed of *υδαΐος*, the genitive of *υδωρ*, water, and *σκοπεω*, to view or conſider.

HYDNUM, in botany, a genus of cryptogamious plants, of the order of fungi, called by Dillenius erinaceus. It has an horizontal fungus, echinated or beſet with ſubulated fibres on its under part.

HYDRA, in aſtronomy, a ſouthern conſtellation imagined to repreſent a water-ſerpent.

The number of ſtars in this conſtellation in Ptolemy's catalogue is twenty-five, and in the Britannic catalogue ſixty-eight.

HYDRAGOGUES, purgative medicines that evacuate a large quantity of watery or ſerous humour.

The word is formed from the Greek, *υδραγωγος*, and derived from *υδωρ*, water, and *αγω*, to drive, or bring away.

In general all ſudorific, aperient, and diuretic medicines are hydragogues.

HYDRANGEA, in botany, a genus of plants whoſe flower conſiſts of five roundiſh equal petals, with ten ſtamina.

The fruit is a roundiſh didymous capſule; the two premanent ſtyle make two beaks to it, and is rendered angular by many ribs: it is coronated by the cup, and divided into two cells by a tranſverſe membrane. The ſeeds are numerous, angular, acuminated, and very ſmall.

HYDRARGYRUM, a name given to mercury or quickſilver. See the article MERCURY.

HYDRASTIS, in botany, a genus of plants whoſe flower conſiſts of three ovate regular petals. The filaments are numerous, linear, compreſſed, and topped with obtuſe antheræ. The fruit is an oblong, compound, acinated berry: and the ſeeds are oblong and ſolitary.

HYDRAULICS, that part of ſtatics which conſiders the motion of fluids, with the application thereof, particularly in artificial water-works.

HYDRELÆUM, in pharmacy, a mixture of oil and water, which Galen reckons refrigerating.

The word is Greek, and compounded of *υδωρ*, water, and *ελαιον*, oil.

Taken inwardly, it provokes vomiting; and, externally, it is anodyne, and promotes ſuppuration.

HYDRENTEROCELE, in ſurgery, a kind of tumor or hernia, where there is a dropſy of the ſcrotum, complicated with a deſcent of the inteſtine.

The word is Greek, and compounded of *υδωρ*, water, *εντερον*, an inteſtine, and *κηλη*, a tumor.

HYDROCANISTERIUM, an engine which ſpouts water in great quantities, and to conſiderable heights, in order to extinguiſh accidental fires in houſes. See ENGINE.

HYDROCELE, *Hernia*, in ſurgery, a ſwelling or dropſy in the ſcrotum. See HERNIA.

HYDROCEPHALUS, in ſurgery, a preternatural tumor of the head ariſing from preternatural lymph.

It is of two ſorts, internal and external; internal, when the water is collected within the bones of the cranium; external, when retained between the ſkin and cranium. The firſt kind is rarely ſeen but in new-born infants, who are generally in great danger: for, upon an inciſion, the lymph is no ſooner diſcharged, than the infant dies, as experience has too often convinced us. If the diſtemper be recent, it will be more adviſeable to repeat gentle purges; whilſt a large compreſs, dipped in lime-water, ſpirit of lavender, or Hungary-water, is applied outwardly.

HYDROCHARIS, the little water-lilly, in botany, a genus of plants, the male flower of which has a ſpatha, and is compoſed of three large, plain, and roundiſh petals; the female flower is like the male one, only without any ſpatha: the fruit is a coriaceous and roundiſh capſule, conſiſting of ſix cells, in which are contained a great number of very ſmall and roundiſh ſeeds.

HYDROCOTYLE, marſh-penny-wort, in botany, a genus of plants, the univerſal corolla of which is uniform in figure, though not in ſituation; and the ſingle corolla are formed of five ovato-acute, patent petals: the fruit is orbicular, erect, and compoſed of two compreſſed and ſemi-orbicular ſeeds.

This plant is common with us in damp places, and is ſuſpected of hurting ſheep that feed on it; whence it is ſometimes called white-rot.

HYDROGRAPHY, that part of geography which conſiders the ſea as it is navigable.

The word is Greek, and derived from *υδωρ*, water, and *γραφω*, to deſcribe.

It teaches how to meaſure the ſea; gives an account of its tides, counter-tides, currents, ſoundings, bays, &c. as alſo its rocks, ſhelves, ſands, promontories, harbours, diſtances from port to port, with

with every thing remarkable out at ſea, or on the coaſt.

HYDROMANCY, the art of foretelling future events by means of water; the ſame as hydatoſcopy.

The word is Greek, and formed of ὑδωρ, the water, and μαντεια, divination.

The other kinds of divination relative to fire, air, and earth, are denominated pyromancy, aeromancy, and geomancy.

HYDROMEL, *Hydromeli*, among phyſicians, water impregnated with honey, either before or after fermentation: that made by fermentation is called vinous hydromel, or mead, and is eſteemed good for the gravel. See HONEY.

The word is Greek, and compounded of ὑδωρ, water, and μελι, honey.

HYDROMETER, an inſtrument to meaſure the gravity, denſity, velocity, force, &c. of water and other fluids. See the articles WATER and FLUID.

The hydrometer is one of the moſt uſeful inſtruments of the philoſophic kind; for though the hydroſtatical ballance be the moſt general inſtrument for finding the ſpecific gravities of all ſorts of bodies, yet the hydrometer is beſt ſuited to find thoſe of fluids in particular, both as to eaſe and expedition.

This inſtrument ſhould be made of copper, ſince ivory imbibes ſpirituous liquors, and thereby alters its gravity; and glaſs is apt to break. The moſt ſimple kind, uſed for finding the ſtrength of ſpirits, conſiſts of a copper-ball B *b* (plate LXI. *fig.* 3.) with a braſs-wire, A B, $\frac{1}{4}$ of an inch thick, ſoldered into it. The upper part of this wire, being filed flat on one ſide, is marked proof at *m*, becauſe it ſinks exactly to this mark in proof-ſpirits. There are other two marks at A and B, to ſhew whether the liquor be $\frac{1}{10}$ above or below proof, according as the hydrometer ſinks to A or emerges to B, when a braſs-weight as C or K has been ſcrewed on at the bottom *c*. There are alſo weights to be ſcrewed on, for ſhewing the ſpecific gravities of fluids quite to common water. The round part of the wire above the ball, may be marked ſo as to repreſent river-water when it ſinks to R W, (*fig.* 4.) the weight which fits the inſtrument for river-water being ſcrewed on at *c*: alſo when put into ſpring-water, mineral-water, ſea-water, and water of ſalt-ſprings, it will emerge or riſe gradually to the marks S P, M I, S E, S A; and, on the contrary, when put into Briſtol-water, rain-water, port-wine, and mountain-wine, it will ſucceſſively ſink to the marks *b r*, *r a*, *p o*, *m o*.

Another kind, which ſerves to diſtinguiſh the ſpecific differences of fluids to great nicety, conſiſts of a large hollow ball B, (*fig.* 5.) with a ſmaller ball *b* under it, partly filled with quick-ſilver or ſmall ſhot, and ſcrewed on to the lower part of the former, in order to render it but little ſpecifically lighter than water: it has alſo a ſmall ſhort neck at C, into which is ſcrewed the graduated braſs-wire A C, which by its weight cauſes the body of the inſtrument to deſcend in the fluid, with part of the ſtem.

When this inſtrument is ſwimming in the liquor, contained in the jar I L M K, the part of the fluid diſplaced by it, will be equal in bulk to the part of the inſtrument under water, and equal in weight to that of the whole inſtrument. Suppoſe the weight of the whole were 4000 grains, then it is evident we can by this means compare together the different bulks of 4000 grains of various ſorts of fluids. For if the weight A be ſuch as ſhall cauſe the aræometer to ſink in rain-water, till its ſurface comes to the middle point of the ſtem 20; and if, after this, it be immerſed in common ſpring-water, and the ſurface is obſerved to ſtand $\frac{1}{10}$ of an inch below the middle point 20; it is evident that the ſame weight of each water differs in bulk only by the magnitude of $\frac{1}{10}$ of an inch in the ſtem.

Now ſuppoſe the ſtem were ten inches long, and weighed one hundred grains, then every tenth of an inch would be one grain weight; and ſince the ſtem is of braſs, and braſs is about eight times heavier than water, the ſame bulk of water will be equal to $\frac{1}{8}$ of a grain; and conſequently to the $\frac{1}{8}$ of $\frac{1}{4000}$ part, that is, a 32000th part of the whole bulk, which is a degree of exactneſs as great as can be deſired. Yet the inſtrument is capable of ſtill greater exactneſs, by making the ſtem or neck conſiſt of a flat thin ſlip of braſs, inſtead of one that is round or cylindrical: by this means we increaſe the ſurface, which is the moſt requiſite thing; and diminiſh the ſolidity, by which the inſtrument is rendered more exact.

In order to adapt this inſtrument to all ſorts of uſes, there ought to be two different ſtems to ſcrew on and off in a ſmall hole at *a*. One ſtem ſhould be ſuch a nice thin ſlip of braſs, or rather of ſteel, like a watch-ſpring ſet ſtraight, as we have juſt mentioned, on one ſide of which ought to be the ſeveral marks or diviſions, to which it will ſink in various ſorts of waters, as rain-water, river-water, ſpring-water, ſalt ſpring-water, &c. And on the other ſide you mark the diviſion to which it ſinks in various lighter fluid, as hot Bath-water, Briſtol-water, Lincomb-water, Chelton-water, port-wine, mountain, madeira, and various other ſorts of wine. But in this caſe the weight A on the top muſt be a little leſs than before, when it was uſed for the heavier waters.

But, in caſe of trying the ſtrength of ſpirituous liquors, a common cylindric ſtem will do beſt, becauſe of its ſtrength and ſteadineſs; and this ought to be ſo contrived that, when immerſed in what is called proof-ſpirit, the ſurface of the ſpirit may be upon the middle point 20; which is eaſily done by duly adjuſting the ſmall weight A on the top, and making the ſtem of ſuch a length that, when immerſed in water, it may juſt cover the ball, and

riſe

riſe to *a*; but, when immerſed in pure ſpirit, it may ariſe to the top at A; then by dividing the upper and lower parts *a* 20, A 20, into ten equal parts each, when the inſtrument is immerſed in any ſort of ſpirituous liquor, it will immediately ſhew how much it is above or below proof.

This proof ſpirit conſiſts of half water and half alcohol, or pure ſpirit, that is, ſuch as when poured upon gun-powder, and ſet on fire, will burn all away, and permit the powder to take fire, which it will, and flaſh as in the open air. But if the ſpirit be not ſo highly rectified, there will remain ſome phlegm or water, which will make the powder wet, and unfit to take fire. This proof-ſpirit of any kind, weighs ſeven pounds twelve ounces per gallon.

The common method of ſhaking the ſpirits in a vial, and by raiſing a crown of bubbles, to judge by the manner of their riſing or breaking away whether the ſpirit be proof or near it, is very precarious, and capable of great fallacy. There is no way ſo eaſy, quick, certain, and philoſophical, as this by the aræometer, which will demonſtrate infallibly the difference of bulks, and conſequently ſpecific gravities, in equal weights of ſpirits, to the 30, 40, or 50 thouſandth part of the whole, which is a degree of accuracy, beyond which nothing can be deſired.

HYDROMETRY, *Hydrometria*, the menſuration of fluids, their gravity, velocity, quantity, &c.

The word is of the ſame original with the preceding. It includes both hydroſtatics and hydraulics.

HYDROMPHALUS, in medicine and ſurgery, a tumor of the navel, containing water. See the article HERNIA.

HYDROPARASTATÆ, a ſect of heretics, the followers of Tatian.

This ſect was called alſo Encratitæ, Apotactitæ, Saccophori, Severiani, and Aquarians.

The hydroparaſtatæ were a branch of the Manichees, whoſe diſtinguiſhing tenet was, that water ſhould be uſed in the euchariſt inſtead of wine.

HYDROPHOBIA, in medicine, a dread of water, which is a ſymptom ariſing in a perſon who has been bitten by a mad dog, or other mad animal.

The word is Greek, and compounded of ὑδωρ, water, and φοβεω, to fear.

The ſymptom is not peculiar to this diſtemper, though it be always an attendant; for we meet with ſeveral inſtances of fevers accompanied with a dread of water.

In a perſon affected with this diſorder, among other extraordinary ſymptoms, the approach of any liquor to the body, eſpecially to the tongue and lips, produces an incredible uneaſineſs, trembling, convulſions, and a ſtate next to direct madneſs; and at the ſame time the patient is racked with an inſatiable thirſt.

In general, Boerhaave affirms, that there is no certain preſervative againſt this diſorder yet known; and that there is no example, that can be depended upon, of any one having been recovered, who was once ſo far gone as to dread water. This author adds, that it is much to be lamented, that after the common methods have been put in practice perpetually without ſucceſs, for ſo many ages, others have not been tried. All the celebrated remedies for this purpoſe, he adds, owe their reputation either to barren ſpeculation, or too great confidence in the reports of others.

His own directions, however, are, 1. As ſoon as the poiſon is received into the body, the part affected, and thoſe adjacent thereto, ſhould have deep ſcarifications made in them. Then large cupping-glaſſes to be applied, or the part to be burnt pretty deep with the actual cautery, and afterwards kept in continual ſuppuration. During the whole of this time, the part is, without interruption, to be fomented with a pickle of ſea-ſalt and vinegar. 2. The cloaths, &c. which have come near the poiſon to be thrown away. 3. The patient is, immediately after receiving the misfortune, to be thrown headlong into the ſea, or ſome river, with threatening words, and other circumſtances capable of ſtriking terror into him; for which purpoſe he is frequently to be immerſed in the water, and again taken up: for the good effects are only produced by the dread and conſternation into which the mind is thrown. He is frequently to be purged with rhubarb, agaric, and the juice of elder bark. 4. Let the patient have a gentle ſweat excited every morning before eating. 5. His feet and hands are to be daily fomented in a bath of water. Laſtly, let him frequently drink cold water, till he vomit it up: uſe acidulated liquors often: his diet muſt be moiſt, light, and laxative, and take them ſo liberally as to vomit them again. He muſt abſtain from large quantities of aromatic ſubſtances, wine, &c. violent exerciſe of body, and all commotions of mind.

The cure is principally to be attempted in the firſt ſtage, or the beginning of the ſecond. It ſeems probable, ſays he, the following method may be of ſome efficacy, eſpecially as it is confirmed by ſome few experiments. Immediately upon the ſigns of approaching madneſs, the caſe is to be treated as extremely inflammatory; wherefore a large quantity of blood muſt be taken away by a large orifice, even till the patient is faint: then directly inject nitrous clyſters, mixed with a little vinegar. Let theſe be repeated boldly, and more frequently than is conſiſtent with prudence in other caſes. After this, the eyes are to be blindfolded, and he thrown into a cold pond, or cold water thrown upon him, till he be no longer afraid of it. Then let him be

im-

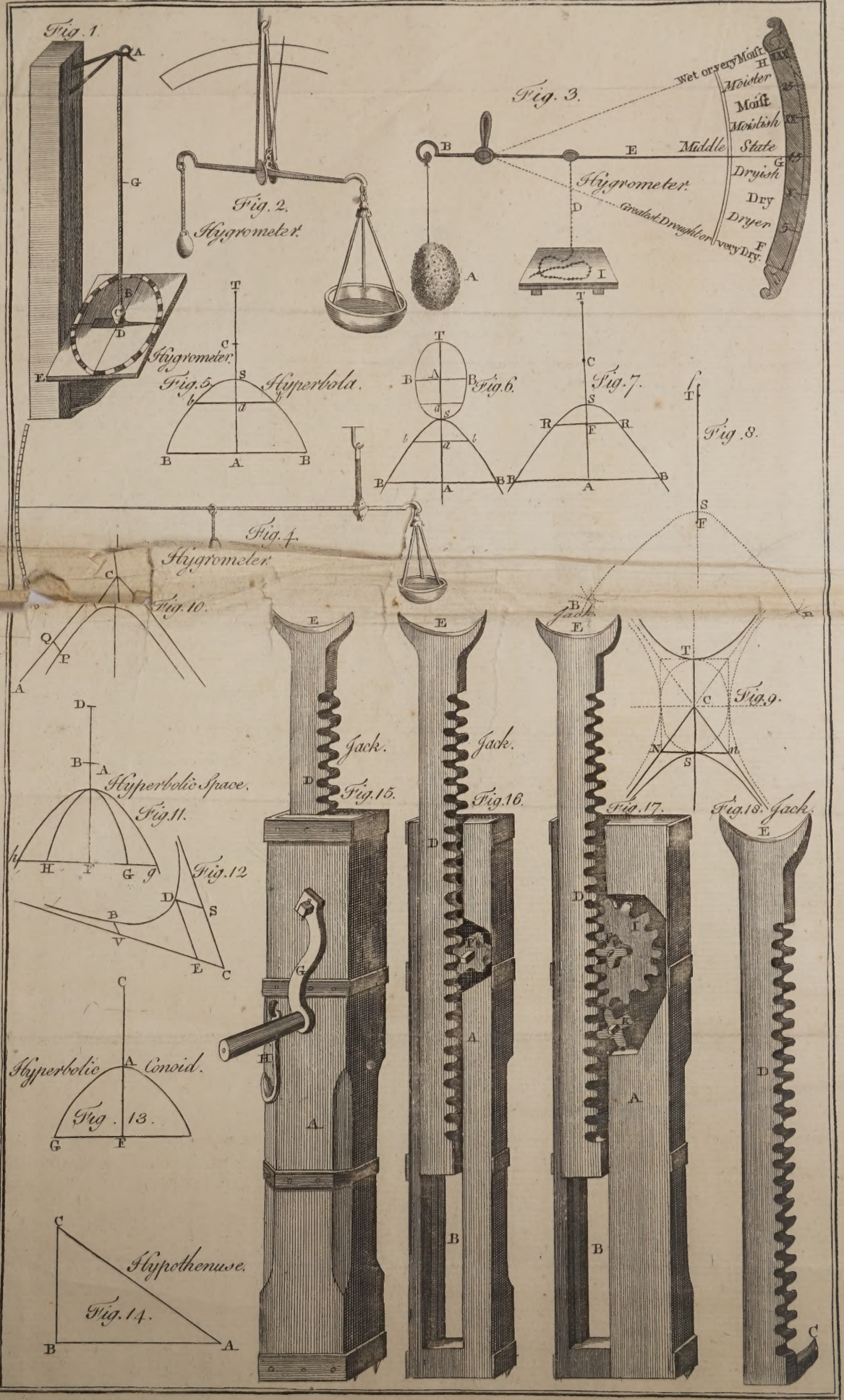


Fig. 1.
Fig. 2.
Hygrometer.
Fig. 3.
Wet or very Moist
Moister
Moist
Moistish
Middle State
Dryish
Dry
Dryer
very Dry.
Greatest Drought or
Hygrometer.
Fig. 4.
Hygrometer.
Fig. 5.
Hyperbola.
Hygrometer.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.
Fig. 11.
Hyperbolic Space.
Fig. 12
Fig. 13.
Hyperbolic Conoid.
Fig. 14.
Hypothenuse.
Jack.
Fig. 15.
Jack.
Fig. 16.
Fig. 17.
Fig. 18. Jack.

immediately forced to drink a large quantity of water; and toward the evening of the ſame day let a ſleep be procured.

We have an account of remedies for this malady in the Philoſophical Tranſactions; one of which is the lichen cinereus terreſtris, or aſh-coloured liverwort, which has been taken into the College Diſpenſatory, under the title of *Pulvis Antilyſſus*, and is the celebrated remedy publiſhed by Dr. Mead, with ſome variation in the proportion of the pepper. The directions, as made public, are, firſt to take away nine or ten ounces of blood; and then take of powdered aſh-coloured liverwort, four drams, and of the powder of black pepper, two drams: mix theſe together, and divide into four doſes; one of which is to be taken faſting for four days ſucceſſively, in half a pint of tepid cow's milk. After taking theſe four doſes, the patient is to be put faſting every morning for a month, either into a cold bath, cold ſpring, or river, remaining therein with his head above water, not longer than half a minute, if the water be exceſſively cold. Then let him bathe thrice a week for fifteen days.

Boerhaave, in his Aphoriſms, treating of the canine madneſs, would have us not to deſpair of diſcovering a peculiar antidote againſt this ſingular kind of poiſon: and this, ſays he, we are encouraged to hope for, from the certain inſtances we already have of remedies effectual againſt particular ſorts of poiſon. Accordingly he had a mind to try what effect mercury would have upon animals under canine madneſs; and from ſeveral experiments, he found it prove ſucceſsful, by adminiſtring ſome grains of turpeth mineral made into boluſes. He alſo mentions the remedy which M. Deſault tried with conſtant ſucceſs in the hydrophobia, which is a mercurial ointment made of one third part of mercury revived from cinnabar, one third part of human fat, and as much of hog's lard. One or two drams of this ointment at a time ſhould be rubbed by intervals, or ſucceſſively, upon and about the wound. As a farther confirmation of the efficacy of mercury in the canine madneſs, he takes notice of a medicine Mr. Cobb, of Buſſelton, near Briſtol, brought from Tonquin, which is much celebrated in the Eaſt-Indies as efficacious in this diſtemper; this is a native and factitious cinnabar, of each twenty-four grains; muſk ſixteen grains, powdered and mixed well together. This powder is to be taken all at once in a tea-cup of arrack, which is ſaid to ſecure the patient for thirty days: after which time the doſe is to be repeated in the ſame manner; but it ſhould be done as ſoon as poſſible after the bite is received: but if the patient have any ſymptoms of the diſeaſe, the ſecond doſe muſt be repeated three hours after the firſt; and this is ſaid to be ſufficient for a cure.

HYDROPHYLLUM, in botany, a genus of plants, whoſe flower conſiſts of a monopetalous campanulated corolla, divided into five ſegments; the ſtamina are compoſed of five ſubulated filaments terminated by oblong incumbent antheræ. The fruit is a globoſe unilocular capſule, with two valves, incloſing a large roundiſh ſeed.

HYDROPIC, a dropſical patient; or a perſon ſwelled and bloated with abundance of water. See the article DROPSY.

HYDROPOTA, in medicine, a perſon who drinks nothing but water.

It has long been controverted among phyſicians, whether or no the hydropotæ live longer than other perſons.

HYDROPS, in medicine, the ſame with dropſy. See the article DROPSY.

HYDROSCOPE, an inſtrument anciently uſed for the meaſuring of time.

The hydroſcope was a kind of water-clock, conſiſting of a cylindrical tube, conical at bottom; the cylinder was graduated, or marked out with diviſions, to which the top of the water becoming ſucceſſively contiguous, as it trickled out at the vertex of the cone, pointed out the hour. See CLEPSYDRA.

HYDROSTATICAL BALLANCE, a kind of ballance contrived for the eaſy and exact finding the ſpecific gravities of bodies, both liquid and ſolid. See the article *Hydroſtatical* BALLANCE.

HYDROSTATICS, that part of mechanics which conſiders the gravity and æquilibrium of fluid bodies, particularly water, and of ſolid bodies immerſed therein.

The word is Greek, and compounded of ὑδωρ, water, and ſτατικη, the ſcience of weights, which is derived from ιſτημι, to eſtabliſh or determine.

Mr. Boyle has applied hydroſtatics in examining and proving the goodneſs and purity of metals, minerals, &c. particularly fluids, in his Hydroſtatica. See *Hydroſtatical* BALLANCE.

As to the laws of hydroſtatics, with the application thereof, ſee FLUID.

HYGIEINE, that branch of medicine which preſcribes rules for the preſervation of health; it may be divided into prophylactice, which foreſees and prevents diſeaſes; ſynteritice, employed in preſerving health; and analeptice, whoſe office is to reſtore health.

The word is Greek, υγιεινη, and derived from υγιης, ſound.

HYGROMETER, or HYGROSCOPE, a machine whereby to meaſure the degrees of dryneſs or moiſture of the air.

The word is Greek, and compounded of υγρος, moiſt, and μετρεω, to meaſure.

In the Philoſophical Tranſactions we have ſeveral methods of conſtructing hygroſcopes.

Mr. Molyneux gives the following:—A B (plate LXIII *fig.* 1.) is a whipcord about four feet long, tied faſt to the end of the hook A. At the end of this

this whipcord hangs the weight 6, about a pound, or ſomething more: this weight is ſo fitted at the end to receive and carry the index D. Under theſe there is placed a graduated circle on the board E F, fixed by a bracket againſt the wall.

The moiſture of the air twiſts the cord, and gives a motion to the index over the diviſions in the graduated circle; and again, as the air grows more dry, the cord untwiſts, and brings back the index by a contrary motion. The rope A B ſhortens and lifts up the weight C by way of a ſcrew, and conſequently muſt give a circular motion to the index.

One of the grand defects of all hygrometers, hitherto invented, is, that they grow weak with age, and do not ſo nicely obey the alterations of the air. The alterations alſo of the air may give this kind of hygroſcope more than one turn. To remedy this, the index D has two complete turns: the point A, as being fixed, has no turn; therefore the middle point G has but one turn; and conſequently, if it be hung up at the point G, or no longer than G D, half the former length, the index D will have but one turn. What is here ſaid of two turns, and the middle point G, may be accommodated to any other number of turns and points in the cord.

Mr. Gould obſerves, that when oil of vitriol is ſaturated in the moiſteſt weather, it afterwards retains or loſes its acquired ſtate, as the air proves more or leſs moiſt. Thus one grain, after its full increaſe, often varied the equilibrium ſo ſenſably, that the tongue of the ballance of $1\frac{1}{2}$ inch long, deſcribed an arch of variation to $\frac{1}{3}$ of an inch compaſs; which arch would have been $2\frac{2}{3}$ inches, had the tongue been but one foot in length, even with that little quantity of liquor: ſo that, if more liquor expanded under a large ſurface be made uſe of, the minuteſt alteration of weather muſt needs very much affect it; and a bare pair of ſcales will afford a hygroſcope as nice, perhaps, as any yet known.

This balance may be contrived two ways; either ſuch whoſe pin ſhould be in the middle of the beam (*fig.* 2.) with a very ſlender tapering tongue of a foot or a foot and a half long, pointing to the diviſions on a broad arched plate, fixed above in the handle; or elſe the ſcale with the liquor may be hung to a point of the beam (*fig.* 3.) very near the pin, and the other extreme made ſo long as to mark a large arch on a board placed conveniently for that purpoſe. The ſcale in either may be a concave glaſs of four or five inches diameter. Laſtly, on the diviſion of the arches ſhould be inſcribed the different temparature of the air ſhewn by the liquor.

The above author imagines oil of ſulphur per campanum, as alſo oil of tartar per deliquium, and the liquor of fixed nitre, &c. might ſucceed as well as oil of vitriol.

Another hygroſcope, he ſays, may be made of a viol ſtring running upon pullies, and ſuſpending a bullet fixed to the ſhorter end of an index, whoſe other extremity is ſo long as to deſcribe a long arch by the falling and riſing of the bullet upon the ſtretching and ſhrinking of the ſtring; which would be the more nice, were the index faſtened to the center.

But among all the inventions, the following ſeems beſt calculated both for diſpatch and accuracy:

A (*fig.* 4.) repreſents a thin piece of ſponge, ſo cut as to contain as large a ſuperficies as poſſible. This hangs by a fine thread of ſilk, upon the beam B, and is exactly balanced from another thread of ſilk at D, ſtrung with the ſmalleſt lead ſhot, at equal diſtances, and ſo adjuſted as to cauſe the index E to point at G, in the middle of the graduated arch F, G, H, when the air is in the middle ſtate, between the greateſt moiſture and the greateſt dryneſs. I, ſhews a little table or ſhelf for that part of the ſilk or ſhot which is not ſuſpended to reſt upon.

The words hygroſcope and hygrometer are commonly both uſed in the ſame ſenſe. However, Wolfius makes ſome difference betwixt an hygroſcope and an hygrometer, ariſing from the etymology; the former only ſhewing the alterations of the air, in reſpect of humidity and dryneſs; and the latter meaſuring them.

The word hogroſcope is Greek, and compounded of *ὑγρος*, moiſt, and *σκοπεω*, to view, or conſider.

HYLE, or HYLEC, among alchemiſts, denotes their firſt matter, or the original chaos of things.

HYLEG, or HYLECH, in aſtrology, ſignifies a planet, or the point in the heavens, which at a perſon's nativity, is accounted the ſignification of life. See the article NATIVITY.

HYMEN, in anatomy, ſignifies a membrane in general; but it is commonly taken for that circular membranous fold, with which the anterior extremity of the great canal in virgins, and eſpecially before the firſt eruption of the menſes, is commonly bordered. This fold is of different breadths, more or leſs ſmooth, and ſometimes ſemi-lunar; and in ſome ſubject leaves but a very ſmall opening, in others a larger; and in all renders the external orifice narrower than the reſt of the cavity. The hymen is formed by the union of the internal membrane of the great canal with that on the inſide of the alæ; it is commonly ruptured after the conſummation of marriage; is quite loſt in delivery; and afterwards only ſome irregular portions of it remain, which, from their ſuppoſed reſemblance to myrtle leaves, have been termed carunculæ myrtiformes. This circle may alſo ſuffer ſome diſorder by two great a flux of the menſes and other particular accidents. *Winſlow.*

HYMENÆA, in botany, a genus of plants whoſe flower is papilionaceous; the fruit is a large ligumen, or pod, of an ovato-oblong figure, with nu-

numerous oval ſeeds ſurrounded with fibres, and a farinaceous matter.

We know but of one ſpecies belonging to this genus, which is a large ſpreading tree growing in plenty in the Weſt-Indies, where it is called the locuſt-tree, the wood of which is eſteemed as good timber as any that part of the world produces; it yields a fine clear reſin (which makes an excellent varniſh) and is called gum anime, in the ſhops. See the article ANIME.

HYMN, a religious ſong. The hymns ſung in the Chriſtian church, as diſtinguiſhed from the pſalms, are pieces of poetry compoſed by pious, but not inſpired, authors.

HYOIDES, in anatomy, a forked bone at the root of the tongue; it is ſituated in the middle ſpace between the angles of the lower jaw; it is a little bone, and reſembles, in ſome meaſure, the baſis of the lower jaw.

HYOSCYAMUS, henbane, in botany, a genus of plants whoſe flower is monopetalous and funnel-ſhaped; the tube is cylindrical, and the corolla is erect and ſpreading, lightly divided into five obtuſe ſegments, one being broader than the reſt; it hath five ſubulated filaments, topped with roundiſh antheræ. The fruit is an ovate obtuſe capſule, with a line marked on each ſide; it contains two cells with numerous ſeeds.

The common henbane, which grows wild on dunghills, &c. is of a very poiſonous quality; it is therefore dangerous to uſe it internally, though its ſeeds have been recommended by ſome in a hæmoptoſis and hæmorrhages; but great caution ſhould be uſed in regard to the quantity preſcribed.

HYOTHYROIDES, in anatomy, a muſcle of the larynx, which ſerves to raiſe it, and conſtringe the glottis.

HYPÆTHROS, or HYPÆTHRON, in ancient architecture, a kind of temple open at the top.

Vitruvius ſays, it was an open building or portico, which had no roof or covering, as the temple of Jupiter Olympius, built by Caſſatius, a Roman architect at Athens.

HYPALLAGE, among grammarians, a ſpecies of hyperbaton, conſiſting in a mutual permutation of one caſe for another.

HYPATA, in ancient muſic, an appellation given to the loweſt chord of a tetrachord.

HYPECOUM, in botany, a genus of plants whoſe flower conſiſts of four petals: the two exterior petals are broad, trilobated, and obtuſe, and are placed oppoſite. The two interior ones ſtand alternately with the others: they are lightly divided into three ſegments, of which the middle one is hollow, compreſſed and erect. The ſtamina are four in number. And the fruit is a long, compreſſed, jointed pod, which is incurved, containing one roundiſh compreſſed ſeed in each joint.

HYPER, ὑπερ, a Greek prepoſition, frequently uſed in compoſition, where it denotes exceſs; its literal ſignification being above, or beyond.

HYPERBATON, in grammar, a figurative conſtruction inverting the natural and proper order of words and ſentences. The ſeveral ſpecies of the hyperbaton are the anaſtrophe, the hyſteron proteron, the hypallage, ſynchyſis, tmeſis, parentheſis, and the hyperbaton, ſtrictly ſo called. See ANASTROPHE, &c.

HYPERBATON, ſtrictly ſo called, is a long retention of the verb, which completes the ſentence.

HYPERBOLA, in geometry, one of the curve lines formed by the ſection of a cone. See CONIC *Sections*.

The plane of every hyperbola, is proportioned by this general theorem:

"As the ſum of the tranſverſe and any abſciſſa, multiplied into that abſciſſa, is to the ſquare of its ſemi-ordinate; ſo is the ſum of the tranſverſe and any other abſciſſa, multiplied into the abſciſſa, to the ſquare of its ſemi-ordinate."

That is, if TS (plate LXIII. *fig.* 5.) be the tranverſe diameter, and S*a*, SA, abſciſſas, and *ba*, BA, ſemi-ordinates: then is T*a*=TS+S*a*, and TA=TS+SA. And it will be T*a*×S*a*: □*ba* :: TA×SA:□BA. That is, TS+S*a*×S*a*: □*ba* :: TS+SA×SA:□BA.

Theſe proportions are the common property of every hyperbola, and differ only from thoſe of the ellipſis in the ſigns + and —. See ELLIPSIS.

That is, if we ſuppoſe TS (*fig.* 6.) the tranſverſe diameter, common to both ſections, viz. both the ellipſis and hyperbola.

Then in the ellipſis it will be TS—S*a*×S*a*: □*ab* :: TS—SA×SA:□AB. And in the hyperbola it is TS+S*a*×S*a*:□*ab*:: TS+SA×SA:□AB as above.

And therefore all that is further required in the hyperbola may be found as in the ellipſis, due regard being had to the changing of the ſigns.

To find the latus rectum or right parameter of any hyperbola.

From the laſt proportion, take any of the antecedents and its conſequent, viz. either T*a*×S*a*: □*ab*. Or, TA×SA:□AB. To them bring in the tranſverſe TS, for a third term, and by thoſe three find a fourth proportional, as in the ellipſis, and that will be the latus rectum.

To find the focus of any hyperbola.

The focus being that point in the hyperbola's axis, through which the latus rectum muſt paſs, as in the ellipſis and parabola, it may be found by this theorem:

"To the rectangle made of half the tranſverſe into half the lactus rectum, add the ſquare of half the tranſverſe; the ſquare root of that ſum will be the diſtance of the focus, from the center of the hyperbola."

To

To describe an hyperbola in plano.

In order to the easy describing of an hyperbola in plano, it will be convenient to premise the following proposition, which differs from that of the ellipsis only in the signs.

Prop. If from the focus of any hyperbola there be drawn two right-lines, so as to meet each other in any point of the hyperbola's curve; the difference of those lines (in the ellipsis it is their sum) will be equal to the transverse diameter.

That is, if F (*fig.* 7.) be the focus, and it be made C f = C F; then the point f is said to be a focus out of the section (or rather of the opposite section) and it will be f B — F B = T S.

If this proposition be truly understood, it must needs be easy to conceive how to describe the curve of any hyperbola very readily by points, when the transverse diameter and the focus are given, or any other data by which they may be found, as in the precedent rules.

Thus: — Draw any straight line at pleasure, in it set off the length of the given transverse T S (*fig.* 8.) and from its extreme points or limits, viz. T, S, set off T f = S F, the distance of the given focus, viz. the point f, without, and F within the section as before; that done, upon the point f, as a center, with any assumed radius greater than T S, describe an arch of a circle; then from that radius take the transverse T S, making their difference a second radius, with which, upon the point F, within the section, describe another arch to cut or cross the first arch as at B. Then will that point B be in the curve of the hyperbola, by the last proposition. And therefore it is plain, that, proceeding on in this manner, you may find as many points as may be thought convenient, which being all joined together with an even hand will form the hyperbola required.

There are several other ways of delineating an hyperbola in plano; one way is by finding a competent number of ordinates, but none more easy and expeditious than this mechanical way: we shall therefore, for brevity's sake, pass over the rest, and leave them to the learner's practice, as being easily deduced from what has been already said.

From the comparisons which have been all along made between the hyperbola and the ellipsis, it will be easy to perceive the coherence that is between those two figures. But for the better understanding of what is meant by the center and asymptote of an hyperbola, consider *fig.* 9. where it is evident that the opposite hyperbolas will always be alike, because they will always have the same transverse diameter common to both, &c. Also that the middle point, or common center of the ellipsis, is the common center to all the four conjugal hyperbolas.

And the two diagonals of the right-angled parallelogram which circumscribes the ellipsis (or is inscribed to the four hyperbolas) being continued, will be such asymptotes to those hyperbolas.

HYPERBOLÆON, in ancient music, the upper or last tetrachord or fourth.

HYPERBOLE, in rhetoric, a figure, whereby the truth and reality of things are excessively either enlarged, or diminished. See the article EXAGGERATION.

The word is Greek, *υπερβολη*, *superlatio*, formed of the verb *υπερβαλλειν*, *ex superare*, to exceed, surpass by far.

The character of an hyperbole is to exaggerate or extenuate the idea of the things spoken of beyond the bounds of truth, or even probability. As, he ran swifter than the wind; he went slower than a tortoise, &c. Hyperboles, says Seneca, lye without deceiving; they lead the mind to truth by fictions; they convey the sentiment intended, though by expressing it in terms which render it incredible. The hyperbole promises too much, in order to make you conceive enough.

Aristotle observes, that hyperboles are the favourite figures of young authors, who love excess and exaggeration; but that philosophers should not use them without a great deal of reserve. The pitch to which an hyperbole may be carried, is a point of great delicacy. To carry it too far, is to destroy it: it is of the nature of a bowstring, which by immoderate tension, slackens; and frequently has an effect quite contrary to that intended.

Those hyperboles are best, which are latent, and are not taken for hyperboles. For this reason, they should scarce ever be used but in a passion, and in the middle of some important incident: such is the hyperbole of Herodotus, speaking of the Lacedæmonians, who fought at Thermopylæ: "They defended themselves for some time with the arms that were left them, and at last with their hands and teeth; till the Barbarians, continually shooting, buried them, as it were, with their arrows."

Now what likelihood is there, that naked men should defend themselves with their hands and teeth against armed men; and that so many persons should be buried under their enemies arrows? Yet does there appear some probability in the thing, by reason it is not sought for the sake of the figure, but the hyperbole seems to arise out of the subject itself. Of the like kind is that passage in a comic poet mentioned by Longinus; "He had lands in the country no longer than a Lacedæmonian epistle.

HYPERBOLICAL *Cylindroid*, in geometry, a solid figure, whose generation is given by Sir Christopher Wren, in the Philosophical Transactions, N°. 48.

There are two opposite hyperbolas joined by the transverse axis; and through the center there is a right line drawn at right angles to that axis; then the hyperbolas are supposed to revolve, by which revolution

volution a body will be generated, which he calls an hyperbolical cylindroid; and whose basis, and all sections parallel to them, will be circles. And in N°. 53, of the Transactions, he applies it to the grinding of hyperbolical glasses; and he says they must be either formed this way, or not at all.

HYPERBOLIC *Space* is the convex area or space contained between the curve of the hyperbola and the external ordinate. If CL $= b$ (plate LXIII. *fig.* 10.) LQ $= x$, CF $= a$, and QP $= y$; then by the nature of the hyperbola $aa = by + xy$ and $y = \frac{aa}{b+x}$, whence $y\dot{x} = \frac{aa\dot{x}}{b+x}$; wherein, if $a = b$, we shall have $\frac{a\dot{x}}{a+x}$ for the fluxion of the indefinite area LQPF, whose fluent $x - \frac{x^2}{2a^2} + \frac{x^3}{3a^3} - \frac{x^4}{4a^4}$ &c. will when $a = 1$ become $x - \frac{1}{2}x^2 + \frac{1}{3}x^3 - \frac{1}{4}x^4 + \frac{1}{5}x^5$, &c. for the area required.

Any hyperbolical space GEHG (*fig.* 11.) is to any other hyperbolic figure of the same height $gEbg$ (whose latus rectum and tranverse diameter, as in the circle, are equal, and also both equal to DE the transverse diameter of the former space) as the conjugate axis AB is to the transverse axis DE. The area of any asymptotical hyperbolic space DEVB (*fig.* 12.) may be found by means of the logarithms. Take the differences of the logarithms of the numbers expressing the ratio of DE to BV, and find the logarithm of that difference, to which add the constant logarithm 0,3622156887; and the sum will be the logarithm of a number expressing the space EDVB, in such parts as the oblong CD is 10000000000.

HYPERBOLIC *Conoid*, is a solid generated by the entire rotation of the hyperbolic space FAG (*fig.* 13.) about the part AF of the transverse axis.

If AC be the semi-transverse axis, it will be as 2AC+AF is to 3AC+AF, so is the cone whose base is the circle described by FG, and altitude AF, to the conoid described as before. To prove this, let AC $= a$, AF $= x$, FG $= y$, the latus rectum $= b$, and ,7854 $= p$; then $y^2 = bx + \frac{bxx}{2a}$; therefore $\frac{4pbx^2}{2} + \frac{2pbx^3}{3a}$ will express the solidity of the conoid, and $\frac{4pbx^2}{3} + \frac{2pbx^3}{3a}$ that of a cone, whose base is the circle described by FG and altitude AF; but these are manifestly in the proportion of $3a+x$ to $2a+x$, or of 3AC+AF to 2AC+AF.

HYPERBOLICUM *Acutum*, is a solid made by the revolution of the infinite area of the space contained between the curve and the asymptote, in the Appollonian hyperbola, turning round that asymptote. This produces a solid, or body, infinitely long; and yet, as Torricellius plainly demonstrates (who gave it this name) it is equal to a finite magnitude.

HYPERBOLIC *Spindle*. See *Hyperbolic* SPINDLE.

HYPERBOLIFORM *Figures*, are such curves as approach, in their properties, to the nature of the hyperbola, called also hyperboloides.

HYPERCATALECTIC, in the Greek and Latin poetry, is applied to a verse, which has one or two syllables too much, or beyond the regular and just measure: as,

Musæ sorores sunt Minervæ. Also,
Musæ sorores Palladis lugent.

The Greek and Latin verses are distinguished, with respect to their measure, into four kinds, acatalectic, catalectic, brachycatalectic, and hypercatalectic. See ACATALECTIC, &c.

The hypercatalectic is also called the hypermeter.

HYPERDULIA, in the church of Rome, a species of worship paid to the Holy Virgin; being greater than the dulia, or worship paid to the saints, but less than the latria, or supreme worship paid to the Deity. See ADORATION and WORSHIP.

HYPERICUM, St. John's-wort, in botany, a genus of plants, the flower of which consists of five oblong, obtuse, spreading petals: the stamina are composed of a great number of capillary filaments, coalescing at their base in three or five distinct bodies, and topped with small antheræ: the fruit is a roundish capsule, with two, three, or five cells, containing a great number of small seeds.

The common St. John's-wort, which grows in many parts of England, has a woody perennial fibrous root; from which arises several round stalks dividing into many branches; these are furnished at each joint with two small oblong leaves placed opposite, without pedicles: the flowers grow on the extremities of the branches in numbers together, of a bright yellow colour, and come out in June.

The leaves and flowers of this species are used in medicine, and have been recommended of peculiar efficacy, in hysterical, hypochondriacal, and melancholic disorders, and alienations of mind; from its supposed virtue in which cases, it received the name of *fuga dæmonum*. It promises to be of some use as a mild detergent and corroborant, discovering to the senses a resinous, bitterish, balsamic impregnation.

HYPERMETER, in the ancient poetry, the same with hypercatalectic. See the article HYPERCATALECTIC.

HYPERSARCOSIS, in medicine and surgery, an excess of flesh, or rather a fleshy excrescence, such as those generally arising upon the lips of wounds, &c. See WOUND and EXCRESCENCE.

HYPERTHYRON, in the ancient architecture, a sort of table used after the manner of a frieze, over the jaumbs of Doric doors and gates, and the lentils of windows. It lies immediately under the corona, and our workmen usually call it the king-piece.

HYPHEN, an accent, or character, in grammar, implying that two words are to be joined, or connected into one compound word, and marked thus -, as pre-eſtabliſhed, five-leaved, &c.

Hyphens alſo ſerve to connect the ſyllables of ſuch words as are divided by the end of the line.

HYPNOTIC, in the materia medica, ſuch medicines as any way produce ſleep, whether called narcotics, hypnotics, opiates, or ſoporifics.

Authors are of various opinions in regard to the manner wherein hypnotics operate. See the article NARCOTICS.

HYPNUM, in botany, a genus of moſſes conſiſting of ſtalks and leaves, and producing membranaceous capſules; theſe capſules ſtand on pedicles, which grow on the alæ of the leaves, and have at their baſe a kind of ſquamous covering, formed of a matter quite different from the leaves of the plant; the ſquamous involucrum at the baſe of the pedicle, is called by Dillenius *perichætium*, and is the greater characteriſtic of the hypna, no moſſes of any other genus having it in this form.

HYPOCAUSTUM, among the Greeks and Romans, a ſubterraneous place, wherein was a furnace, to heat the baths. See BATHS.

Another kind of hypocauſtum was a kind of kiln, to heat their winter parlours.

Among the moderns, it is that place where the fire is kept, that warms a ſtove or hot-houſe.

HYPOCHOERIS, in botany, a genus of plants whoſe flowers are compound, imbricated, and uniform, each conſiſting of numerous hermaphrodite corollulæ, that are all equal: the partial flower is monopetalous, ligulated, linear, truncated, and divided into five ſegments; there is no pericarpium; the cup is connivent and globoſo-acuminated; the ſeed is ſingle, oblong, and ending in a ſubulated pedicle, covered with down.

HYPOCHONDRIA, in anatomy, that part of the body on both ſides, which lies under the ſpurious ribs, and is extended to the ilia; comprehending not only the muſcles, but the internal viſcera.

HYPOCHONDRIAC *Affection*, *Paſſion*, or *Diſeaſe*, *Morbus Hypochondriacus*, vulgarly called the ſpleen, vapours, &c. in medicine, a diſorder that principally exerts its tyranny under the enſiform cartillage and ſpurious ribs, in the region of the hypochondria.

HYPOCISTIS, in pharmacy, an inſpiſſated juice, much reſembling the true Egyptian acacia. We meet with it in moderately large flat maſſes. It is conſiderably hard and heavy, of a fine ſhining black colour, like that of liquorice juice, when freſh broken, and of a duſkier black on the ſurface. It is brought to us from the Levant, and from ſome parts of Europe. The French make a good deal of it from the plants of their own growth, and ſometimes ſupply other places with it.

Hypociſtis is an aſtringent, and that of conſiderable power; it is good againſt diarrhœas and hæmorrhages of all kinds, and may be uſed in repellent gargariſms in the manner of the acacia; but is very rarely met with genuine in our ſhops; the German acacia being uſually ſold under its name.

HYPOGASTRIC, an appellation given to the internal branch of the iliac artery. See the articles ARTERY and ILIAC.

HYPOGASTRIC VEINS, ariſe on each ſide from the iliacs, and ſend out branches to the rectum. See the article VEIN.

HYPOGASTRIUM, in anatomy, the lower part of the abdomen. See ABDOMEN.

HYPOMOCHLION, in mechanics, the ſame with fulcrum. See FULCRUM.

HYPOPYON, in medicine, a collection of purulent matter, immediately under the cornea, near the aqueous humour.

HYPORCHEMA, in the Greek poetry, a poem, conſiſting of divers kinds of verſe, and of different lengths; but always full of ſhort, or pyrrhichic feet.

HYPOSTATIS, among divines, ſignifies a perſon, or ſubſtance; chiefly uſed in ſpeaking of the perſons of the Trinity. See the article TRINITY.

HYPOSTASIS, in medicine, denotes the ſediment of urine.

HYPOTHECA, in the civil law, the ſame with mortgage in the common law. See the article MORTGAGE.

HYPOTHENAR, in anatomy, the abductor muſcle of the little finger. See the article ABDUCTOR.

HYPOTHENUSE, or HYPOTENUSE, in geometry, the longeſt ſide of a right-angled triangle, which ſubtends the right-angle. Thus, in the right-angled triangle ABC (plate LXIII. *fig.* 14.) AC is the hypothenuſe.

The word is Greek, and derived from ὑπο, under, and τεινω, to extend.

The 47th prop. of Euclid's firſt book demonſtrates, that in every rectilinear right-angled triangle, the ſquare of the hypothenuſe is equal to the ſquares of both the other ſides. It is particularly called the Pythagorean problem, from its invention by Pythagoras, who is ſaid to have ſacrificed a whole hecatomb to the muſes, in gratitude for their aſſiſting him in the diſcovery.

HYPOTHESIS, in logic, a propoſition, or principle, which is taken for granted, in order to draw concluſions therefrom, for the proof of ſome point in queſtion.

The word is Greek, and compounded of ὑπω, under, and θεσις, a theſis, or poſition, which is derived from τιθημι, to place, or put.

HYPOTHESIS, in phyſics, &c. an imaginary ſyſtem laid down to account for ſome phænomenon of nature.

Whatever is not derived from phænomena, ſays Sir

Sir Isaac Newton, is an hypothesis; and no hypotheses of any kind are to be admitted in experimental philosophy.

HYPOTHESIS, in astronomy, is more particularly applied to the several systems of the heavens, as different astronomers have supposed the arrangement and motion of the heavenly bodies. The principal of these are the Ptolemaic, Copernican, and Tychonic systems.

HYPOTRACHELION, in architecture, denotes a little frieze in the Tuscan and Doric capitals, between the astragal and annulets, called likewise colerin, gorgerin, &c. By some it is applied to the neck of any column, or that part of the capital below the astragal.

HYPOTYPOSIS, in rhetoric, signifies a lively description.

HYPOZOMA, in anatomy, a membrane that separates two cavities: such is the diaphragm.

HYPSILOIDES, in anatomy, the same with os hyoides. See the article HYOIDES.

HYSSOP, *Hyssopus*, in botany, a genus of plants, the flower of which is monopetalous and ringent, with a narrow cylindrical tube; the upper lip erect, roundish, and emarginated; the lower one divided into three short segments, the middle one of which is hollow and cordated: it hath no pericarpium; but the seeds, which are oval and four in number, are placed in the bottom of the cup.

The common hyssop hath brittle branchy stalks, which are furnished with small lanceolated leaves, placed opposite, in pairs, of a darkish green colour. The flowers come out in July and August, and are of a blue colour, growing in spikes: the whole plant is perennial, and cultivated in gardens.

Hyssop has an acrid taste, and a strong aromatic smell; it strengthens the stomach, helps digestion, and, by its power of attenuating the viscous matter from the lungs, promotes expectoration, and is therefore good in moist asthmas. Its good effects in the stomach are of the same kind, depending on its attenuating and absterging the viscous phlegm lodged there, which impedes the discharge of its proper function. It is also good in diseases of the head. It is best taken in infusion, in the manner of tea, not made so strong as to be disagreeable to the palate, and often repeated. It is one of those few simples, of which there is a distilled water made that is good for any thing; there comes over with it so much of a warm essential oil, as not only prevents it from mothering and stinking, which most simple waters are subject to, but also makes it a good pectoral, and efficacious to all those purposes which the herb is given for in any other form.

Externally, hyssop is greatly recommended in bruises; the blackness settling under the eyes from blows, is carried off very readily by a cataplasm of the leaves, or only a little bundle of them sewed up in a linen rag, and applied to the part: and Ray gives us an account from Mr. Boyle, of a violent contusion of the thigh, from the kick of a horse, very happily cured by this herb, boiled as a cataplasm; he tells us, the violent pain was almost instantly removed, and the very mark and blackness taken off in a few hours.

HYSTERICAL *Disease*, HYSTERIC *Affection*, or *Passion*, in medicine, a disease in women, likewise called a suffocation of the uterus, or fits of the mother.

There is no disease so vexatious to women as that called hysterical; and although it may not be attended with any great danger, yet it is frequently very terrifying: and it also sometimes deprives them of their senses as effectually, as if they had been seized with an epileptic fit.

When a woman has fallen into an hysterical fit, blood-letting will be of use, if she has strength to bear it; if not, cupping-glasses are to be applied to her groins or hips: but if she continues long in it, put the snuff of a candle, or some other thing of a fœtid smell, to her nostrils, in order to rouse her. In the mean time, her thighs and legs ought to be rubbed.

When she is recovered from the fit, proper means must be used to prevent a relapse. If she be liable to obstructions, and not regular, the menstrual discharges are to be promoted. The strong-smelling gums and steel medicines are very serviceable, and it is very beneficial to use exercise. But the disturbances of the mind generally require proper remedies. *Mead.*

HYSTERON PROTERON, in grammar and rhetoric, a species of the hyperbaton, wherein the proper order of construction is so inverted, as that the part of any sentence which should naturally come first is placed last, as in this of Terence, *Valet & vivit*, for *Vivit & valet*.

HYSTEROTOMIA, ὑστεροτομία, in anatomy, an anatomical dissection of the uterus or womb. See the article UTERUS.

HYSTEROTOMOTOCY, ὑστεροτομοτοκία, among chirurgical writers, the same with the Cæsarian section. See CÆSARIAN *Section*.

I.

I, Is the third vowel and ninth letter of the Engliſh alphabet: it is alſo a conſonant, and accordingly has two forms. When a conſonant, it is lengthened downwards, thus J, and pronounced not much unlike the ſoft G before *e*, as in *geſture*.

The letter I was derived from the old Hebrew Jod, and is ſounded by throwing the breath ſuddenly againſt the palate with a ſmall hollowing of the tongue, and the ſame opening of the lips and teeth nearly as in pronouncing A and E.

The Greeks had no J conſonant, and therefore made uſe of the I vowel inſtead of it, as ΙΗΣΟΥΣ. The Engliſh and French have two kinds of J conſonants; the firſt has a ſnuffling kind of ſound, and ſerves to modify that of the following vowels, as in *Jew*, *jolly*, &c. The latter is pronounced like the Hebrew *Jod*, which is ſounded as the conſonant *y*, as we find it ſtill among the Germans, &c. Of this we have ſome inſtances in words which are indifferently written with a *y* or *i* before a vowel, as *voiage*, *voyage*, &c.

J, in abbreviations and cyphers, ſtands for Jeſus.

I was uſed by the ancients as a numeral, denoting 100, according to this verſe:

I. c. *Compar erit, et centum ſignificabit.*

The Greek *Iota*, and the Hebrew *Jod*, ſtand but for ten.

JACENT, a term applied by Helmont to nature, when a diſeaſe is riſen to a head, and the morbific matter ſtrives to ſuppreſs the vital flame.

JACK, in mechanics, a portable machine for raiſing great weights.

In order to explain the operation of this machine, we have given perſpective views of its ſeveral parts on plate LXIII. *fig.* 15, 16, 17, 18, where *fig.* 15 is the whole machine; *fig.* 16, ſhews the rack, and the pinion which carries it; *fig.* 17, diſplays the whole machinery; and *fig.* 18, the rack, ſeparately. The ſame letters refer to the ſame parts in all the four figures.

A, is a ſtrong caſe of wood, firmly bound with iron.

B, the open part of the caſe in which the rack moves.

C, the bottom claw of the jack, intended for raiſing weights very near the ground.

D, the rack, ſeparated from the other parts of the machinery.

E, the upper claw, or fork, of the jack.

F, a pinion of four leaves, that moves the rack D.

G, the winch or crank of the handle.

H, a hook to prevent the weight, when raiſed to a ſufficient height, from falling down again, by putting the curved part of the hook round the handle.

I, a large wheel, with ſixteen teeth.

K, a pinion of four leaves, that moves the large wheel I.

The power of this machine is very eaſily calculated in the following manner:

Suppoſe the winch or crank G, to be four times as long as the radius of the pinion K, then will the power of the machine in this part be as 4 to 1. But the pinion K has only four leaves, and the wheel I ſixteen teeth; therefore the power of the machine in this part is alſo as 4 to 1. Conſequently, $4 \times 4 = 16$, is the power of both theſe parts conjointly. And as the wheel I has ſixteen teeth, and the pinion T, that moves round the rack, only four leaves, the power of the machine in this part is alſo as 4 to one. Conſequently the whole power of the machine is as 64 to 1: for $4 \times 4 \times 4 = 64$. If therefore we ſuppoſe a man can work at the handle with a force of thirty pounds, he will be able to raiſe a weight of one thouſand nine hundred and twenty pounds, ſuppoſing the machine to have no friction.

Kitchen JACK, a compound engine, where the weight is the power applied to overcome the friction of the parts, and the weight with which the ſpit is charged; and a ſteady and uniform motion is obtained by means of the fly. See the article FLY.

Smoak JACK. See SMOAK-JACK.

JACK-DAW, in ornithology, a ſpecies of corvus

vus, with a black and grey head, a browniſh black body, and the wings and tail black.

It is one of the ſmalleſt of the crow-kind, but an erect and well-ſhaped bird.

JACKALL, in zoology, an animal of the dog-kind, with a ſlender ſnout.

It is a very beautiful creature, and ſo like a dog, as to be miſtaken at firſt ſight for ſome mungrel breed of that animal.

Its ſize is that of a ſmall hound; and, in the Eaſt, where it is a native, there are vaſt packs of them, often more than two hundred in a company, which hunt animals they would never dare to attack ſingle. It is not impoſſible that lions and other beaſts of prey may be alarmed by the cries of theſe animals in their chace, and fall in and rob them of their prey; but the general opinion of their attendance on the lion, is fabulous.

JACOBINE, or JACK, in ornithology, a very ſmall ſort of pigeon, with a range of feathers inverted quite over the hinder part of the head; bearing ſome reſemblance to a friar's hood, whence the name.

JACOBINE MONKS, the ſame with the Dominicans. See DOMINICANS.

JACOBITES, a term of reproach beſtowed on the perſons, who, vindicating the doctrines of paſſive obedience and non-reſiſtance with reſpect to the arbitrary proceedings of princes, diſallow of the late Revolution, and aſſert the ſuppoſed rights, and adhere to the intereſts of the late abdicated king James and his family.

JACOBITES, in church-hiſtory, a ſect of Chriſtians in Syria and Meſopotamia; ſo called either from Jacob, a Syrian, who lived in the reign of the emperor Mauricius; or from one Jacob, a monk, who flouriſhed in the year 550.

JACOB'S-STAFF, a mathematical inſtrument, otherwiſe called fore-ſtaff. See FORE-STAFF.

JADE-STONE, a name given to a hard greyiſh green ſpecies of jaſper, of which the Turks generally make the handles of the ſabres of great people. See the article JASPER.

JALAP, in botany, a plant with thick, fleſhy, raddiſh-like roots; jointed ſtalks and brances; acuminated ſomewhat oval leaves ſet in pairs; and elegant, numerous, monopetalous, funnel ſhaped flowers, purple, yellow, white, or diverſly variegated, ſtanding in double cups, of which the innermoſt incloſes the flower and the outer ſurrounds its baſis: each flower is followed by a wrinkled, roundiſh, pentagonal, umbilicated fruit, about the ſize of a pepper-corn, including a white kernel. It is perennial, a native of the Eaſt-Indies, and cultivated in our gardens. Whether the roots produced here are equivalent in virtue to thoſe which are brought from abroad, has not, Dr. Lewis obſerves, been yet experienced.

The officinal jalap roots come from the province of Xalapa in New Spain; in thin tranſverſe ſlices, ſolid, hard, weighty, of a dark greyiſh colour on the outſide or cortical part, internally of a dark greyiſh, with ſeveral black circular ſtriæ: the hardeſt, darkeſt coloured, and thoſe which have the moſt of theſe reſinous veins, are the beſt.

This root has ſcarcely any ſmell, and very little taſte upon the tongue: ſwallowed, it affects the throat with a ſlight kind of pungency and heat. Taken in doſes of a ſcruple or half a dram, it proves an effectual, and in general a ſafe purgative; very rarely occaſioning any ſevere gripes or nauſea, which too frequently accompany the other ſtrong cathartics. Some have prohibited the uſe of this cathartic to children; apparently on no very good foundation. Young children, from the laxity of their ſolids, and the ſoft lubricating quality of their food, generally bear theſe kinds of medicines better than adults; and adults of a ſpongy, lax, or weak habit, better than the rigid or robuſt. Few, if any, of the ſtrong reſinous purgatives are in either caſe more innocent than jalap.

JAMAICA-PEPPER, *Pimienta*, or *Pimenta*, in the materia medica. See PIMIENTA.

JAMAICA-WOOD, a name ſometimes given to brazil. See the article BRAZIL.

JAMB, or JAUMB, among carpenters, an appellation given to door-poſts, as alſo to the upright poſts at the ſides of window-frames; and among bricklayers, it denotes the upright ſides of chimnies, from the hearth to the mantle-tree.

IAMBIC VERSES, are verſes in the Greek and Latin poetry, which are ſo called, as they wholly, or, for the moſt part, conſiſt of an iambus or iambic foot.

IAMBUS, in ancient poetry, a ſimple foot, conſiſting of a ſhort and a long ſyllable, as *pios*. See FOOT.

JAMES, or *Knights of St.* JAMES, a military order in Spain, firſt inſtituted about the year 1170, by Ferdinand II. king of Leon and Galicia. The greateſt dignity belonging to this order is grand maſter, which has been united to the crown of Spain. The knights are obliged to make proof of their deſcent from families that have been noble for four generations, on both ſides: they muſt alſo make it appear that their ſaid anceſtors have neither been Jews, Saracens, nor heretics; nor have ever been called into queſtion by the inquiſition. The novices are obliged to ſerve ſix months in the galleys, and to live a month in a monaſtery; they obſerve the rule of St. Auſtin, making no vows but of poverty, obedience, and conjugal fidelity.

St. JAMES'S-DAY, a feſtival of the Chriſtian church, obſerved on the 25th of July, in memory of St. James the greater, ſon of Zebedee.

Epiſtle of St. JAMES, a canonical book of the

New Teſtament, being the firſt of the catholic or general epiſtles; which are ſo called, as not being written to one but to ſeveral Chriſtian churches.

JANIZARIES, an order of the Turkiſh infantry, reputed the grand ſignor's guards, and the main ſtrength of the Ottoman army.

JANSENISTS, in church-hiſtory, a ſect of the Roman-catholics in France, who follow the opinions of Janſenius, biſhop of Ypres, and doctor of divinity of the univerſities of Louvain and Douay, in relation to grace and predeſtination.

JANUARY, the firſt month in the year, according to the preſent computation. It was introduced by Numa into the calendar, and placed at the winter ſolſtice, where March was before, which Romulus had placed at the vernal equinox.

The word is derived from Janus, to whom the Romans, on the firſt of this month, offered ſolemn ſacrifices.

JAPAN EARTH, in the materia medica. See the article TERRA *Japonica*.

JAPANNING, the art of varniſhing and drawing figures on wood, in the ſame manner as is done by the natives of Japan in the Eaſt-Indies.

JASHER, a book mentioned in ſcripture, and ſaid by ſome to be loſt; but ſome of the moſt celebrated Hebrew doctors ſay they have found it; telling us, that it is the book of Geneſis, wherein are contained the acts of Abraham, Iſaac, Jacob, and the other patriarchs, who were, by way of excellence, called Jaſherim, the Juſt: but that man muſt be eaſily ſatisfied, who can acquieſce with this interpretation. Dr. Lightfoot thinks the book of Jaſher is the ſame with the book of the Wars of God; but there is little foundation for it. This book, according to Grotius, was a triumphal poem; but Joſephus ſeems to bid faireſt for the truth, who ſays, that by this book are to be underſtood certain records kept in ſome place on purpoſe, and afterwards in the temple, giving an account of what happened among the Hebrews from year to year, and particularly the prodigy of the ſun's ſtanding ſtill, and directions and laws about the uſe of the bow; that is, the ſetting up of archery, and maintaining military exerciſes. If it be enquired why the title given to theſe Hebrew annals was the book of Jaſher (that is, the upright) this may be given as a reaſon, Becauſe it was by all perſons reckoned as a very juſt and authentic account of all thoſe events and occurrences which it recorded: it was compoſed with great uprightneſs and truth; thence it went commonly by the name of Jaſher's book, or chronicle. It was not the work of any inſpired perſon, but was of the nature of common civil annals; and, conſequently, we cannot infer from hence, that any book properly belonging to the Holy Scripture, that is, that was written by the inſpiration of the Holy Ghoſt, is at this day miſſing.

JASMINUM, the jaſmine, or jeſſamine-tree, in botany, a genus of plants, the leaves of which are in many ſpecies pinnated; the cup of the flower conſiſts of one leaf, but is divided at the top into five ſegments; the flower conſiſts of one leaf, is funnel-ſhaped, and divided into five ſegments: the flowers are ſucceeded by berries, which ſplit in the middle, each ſide, for the moſt part, containing a ſeparate ſeed.

The common white jaſmine is eaſily propagated by laying down the tender branches in the ſpring, which, by the ſucceeding ſpring, will be rooted ſtrong enough to be tranſplanted. They may alſo be raiſed by cuttings, which ſhould be planted in autumn in a moiſt border, where they may have the morning ſun: but they muſt be ſcreened from the violence of the ſun in the heat of the day, and frequently watered in dry weather. The cuttings, thus managed, will many of them live, and have roots fit to be removed in the following ſpring: but this method is ſeldom practiſed, the layers always making the beſt plants.

The two ſtriped ſorts ſhould be planted in a warm ſituation, eſpecially the white ſtriped; for they are much more tender than the plain, and are very ſubject to be deſtroyed by great froſts, if they are expoſed thereto: it will therefore be proper to preſerve a plant of each kind in pots, which may be removed into the green-houſe in winter, leſt, by expoſing them to the cold, they ſhould be deſtroyed, and the variety loſt.

JASPER, in natural hiſtory, a genus of ſcrupi, of a complex irregular ſtructure, of great variety of colours, and emulating the appearance of the finer marbles, or ſemi-pellucid gems.

JATROPHA, caſada plant, in botany, a genus producing male and female flowers: the male is monopetalous, and ſaucer-ſhaped, with a very ſhort tube; and the limb divided into five ſegments. The female flower is pentapetalous and roſaceous, placed in the ſame umbel with the male. The fruit is a roundiſh trilocular capſule, containing three roundiſh ſeeds.

JAVELIN, *Haſta*, in antiquity, a ſort of ſpear, five feet and a half long; the ſhaft of which was of wood, with a ſteel point.

Every ſoldier, in the Roman armies, had ſeven of theſe, which were very light and ſlender.

JAUNDICE, in medicine, a diſeaſe ariſing from a vitiated ſtate of the blood and humours, by means of an excrementitious bile, from a fault of the bilious ducts, greatly injuring the functions of the whole body, and rendering the ſkin of a yellow or livid colour.

JAW, *Maxilla*, in anatomy. See the article MAXILLA.

IBERIS, in botany, a genus of plants whoſe flower conſiſts of four unequal petals, vertically oval, obtuſe, and patent, with ſix ſtamina.

The fruit is a little pod, erect, roundiſh, compreſſed

preſſed, ſurrounded by an acute bifid margin on the upperſide, and containing two cells, in each of which is incloſed an oval ſeed.

IBEX, in zoology, an animal of the goat-kind, with extremely long nodoſe horns, which bend backwards, and are of a blackiſh colour, and annulated on the ſurface. The body is of a dark duſky colour, and is leſs in proportion to the height than that of the common goat: it has a great reſemblance to the deer-kind; the legs are alſo perfectly, like thoſe of the deer, ſtraight, elegant, and ſlender. It is frequent in many parts of Europe, and, notwithſtanding its vaſt horns, runs and leaps with ſurpriſing force and agility.

IBIS, a bird which was very uſeful to the Egyptians for deſtroying ſerpents, locuſts, and caterpillars; and, on that account, had divine honours paid it.

It is all over black, and about the ſize of the curlew, with the head of a cormorant, and the long neck of a heron.

ICE, *Glacies*, in phyſiology, a ſolid, tranſparent, and brittle body, formed of ſome fluid, particularly water, by means of cold. See COLD, FROST, and FREEZING.

ICE-HOUSE, a building contrived to preſerve ice for the uſe of a family in the ſummer ſeaſon.

Ice-houſes are more generally uſed in warm countries, than with us, particularly in Italy, where the meaneſt perſon, who rents a houſe, has his vault or cellar for ice.

ICH DIEN, the motto of the prince of Wales's arms, ſignifying, in the High Dutch, *I ſerve*.

ICHNEUMON, in zoology, the name of an animal, of which there have been a multitude of idle and fabulous things aſſerted. It is a creature of the weaſel kind, with a longer and narrower body than a cat, and ſomething approaching both in ſhape and colour to the badger.

ICHNEUMON is alſo the name of a genus of flies, of the hymenoptera order, with a triple ſting at the anus.

ICHNOGRAPHY, in perſpective, the view of any thing cut off by a plane parallel to the horizon, juſt at the baſe of it.

Among painters it ſignifies a deſcription of images, or of ancient ſtatues of marble and copper, of buſts and ſemi-buſts, of paintings in freſco, Moſaic works, and ancient pieces of minature.

ICHNOGRAPHY, in architecture, a deſcription or draught of the platform or ground-work of a houſe, or other building. Or it is the geometrical plan or platform of an edifice or houſe, or the ground-work of an houſe or building, delineated upon paper, deſcribing the form of the ſeveral apartments, rooms, windows, chimnies, &c.

ICHNOGRAPHY, in fortification, denotes the plan or repreſentation of the length and breadth of a fortreſs, the diſtinct parts of which are marked out, either on the ground itſelf, or on paper.

ICHOGLANS, the grand ſignior's pages, ſerving the ſeraglio.

ICHOR properly ſignifies a thin watery humour, like ſerum; but is ſometimes alſo uſed for a thicker kind, flowing from ulcers, called likewiſe ſanies.

ICHTHYOCOLLA, vulgarly called iſinglaſs, a ſolid glutinous ſubſtance, prepared from a fiſh of the ſturgeon kind caught in the rivers of Ruſſia and Hungary.

ICHTHYOLOGY, ιχθυολογια, the ſcience of fiſhes, or that branch of zoology which treats of fiſhes. See the article FISH.

ICHTHYOLOGIST, an author who has written profeſſedly of fiſhes.

ICHTHYS, ιχθυς, in antiquity, a celebrated acroſtic of the Erythræan ſibyl; the firſt words of each verſe of which were, Χριστος Θεϖ υιος σωτηρ, that is, *Jeſus Chriſtus Dei filius ſervator*; and the initial Greek letters form the word ιχθυς, whence the name.

ICONOCLASTS, εικονοκλαστοι, in church hiſtory, an appellation given to thoſe perſons, who, in the eighth century, oppoſed image-worſhip; and is ſtill given by the church of Rome, to all Chriſtians who reject the uſe of images in religious matters. See IMAGE.

ICOSAHEDRON, a regular ſolid, terminated by twelve equilateral and equal triangles.

The word is Greek, and compounded of εικοσι, twenty, and εδρα, a baſe.

It may be conſidered as conſiſting of twenty triangular pyramids, whoſe vertices meet in the center of a ſphere that circumſcribes them, and therefore have their heights and baſes equal; wherefore the ſolidity of one of theſe pyramids multiplied by twenty, the number of baſes, gives the ſolid content of the icoſahedron.

ICOSANDRIA, the name of the twelfth claſs in the Linnæan ſyſtem of botany, comprending thoſe plants whoſe flowers are hermaphrodite. The calyx monophyllous and concave, with the corolla faſtened by its claws to the inner ſide of the cup; and containing twenty or more ſtamina affixed to the cup. The principle characteriſtic of this claſs is rather to be taken from the manner of inſertion; for though the number of ſtamina are rarely leſs than twenty, yet in ſome ſpecies they frequently exceed it.

To this claſs belong the torch-thiſtle, almond, plumb, pear, ſtrawberry, myrtle, with ſeveral other genera.

ICTERIC DISEASE, the ſame with the jaundice. See JAUNDICE.

IDEA, the repreſentation or reſemblance of ſomething, even though not ſeen, as conceived by the mind.

As to the origin of ideas, the Peripatetics maintain that external objects emit ſpecies entirely reſembling them, and that theſe ſpecies ſtriking on our ſenſes are by them tranſmitted to the underſtanding; that being material, they are rendered intelligible by the active intellect, and are at length received by the paſſive.

Others think that our ſouls have of themſelves the power of producing ideas of things we would think upon, and that they are excited to this by the impreſſions which objects make our ſenſes, though theſe impreſſions are not images of any thing reſembling the objects that occaſioned them.

Others maintain that the mind, by conſidering itſelf and its own perfections, can diſcover all things that are without. Others, with Des Cartes, hold that our ideas are innate or born along with us.

Malebranche and his followers maintain that God has in himſelf the ideas of all the beings he has created, and thus he ſees all things in conſidering his own perfections to which they correſpond; and that, as he is intimately united to our ſouls by his preſence, our minds perceive things in him which repreſent created beings; and that thus we come by all our ideas: and yet, ſays he, though we ſee all ſenſible things in God, we have not our ſenſations in him: for in our perception of any ſenſible object is included both a ſenſation and a pure idea. The ſenſation is a mortification of the ſoul, and it is God who cauſes it in us; but the idea joined with the ſenſation is in God, and it is in him we ſee it.

The Carteſians diſtinguiſh three kinds of ideas; the firſt innate; ſuch as we have of God, as a being infinitely perfect: ſecondly, adventitious, which the mind receives in proportion as objects preſent themſelves to our ſenſes: thirdly, factitious, thoſe which the mind forms by aſſembling and combining the ideas it already had, and theſe are called complex. But Mr. Locke has made it appear that all our ideas are owing to our ſenſes, and the reflection of our minds upon thoſe ideas which the ſenſes have at firſt furniſhed us with; and that the diſtinction of the Carteſians is mere chimera. See *Locke's Eſſay on the Human Underſtanding.*

IDENTITATE NOMINIS, in law, a writ that lies where a perſon is impriſoned inſtead of another of the ſame name, commanding the ſheriff to enquire whether the priſoner be the perſon againſt whom the action was brought, or not; and if not, to diſcharge him.

IDENTITY, or SAMENESS, denotes that by which a thing is itſelf, and not any thing elſe; in which ſenſe, identity differs from ſimilitude as well as diverſity.

IDES, *Idus*, in the Roman calendar; eight days in each month are ſo denominated, commencing in the months of March, May, July, and October, on the fifteenth day, and in the other months on the thirteenth, and reckoned backward, ſo as in the four months above ſpecified to terminate on the eighth day, and in the reſt on the ſixth.

The word is variouſly derived; it ſeems moſt probably to be formed of the Etrurian word *iduo*, for *divido*, to divide; becauſe the ides divided the month into two equal parts.

The ides came between the calends and nones. The fourteenth day of March, May, July, and October, and the twelfth of the other eight months, was *pridie idus*, or the eve of the ides: the thirteenth in the four months, and the eleventh in the other eight, was called 3 idus, or the third of the ides of ſuch months: and ſo on to the eighth and ſixth days, which made the eighth of the ides, 8 idus.

The method of reckoning is ſtill retained in the Roman chancery, and calendar of the breviary.

The ides of May were conſecrated to Mercury; thoſe of March were eſteemed unhappy after Cæſar's murder on that day: the time after the ides of June was reckoned fortunate for thoſe who entered into matrimony; the ides of Auguſt were conſecrated to Diana, and obſerved as a feaſt day by the ſlaves. On the ides of September auguries were taken for appointing the magiſtrates, who formerly entered upon their offices on the ides of May, afterwards on thoſe of March.

IDIUM, *Idioma*, either the peculiarities of a language, or the particular dialect of ſome province, differing in ſome reſpects from the language of the nation in general, from which it is derived.

The word is Greek, ἰδίωμα, ſignifying the ſame thing, and derived from ἴδιος, proper, or one's own.

IDIOPATHY, in phyſic, a diſorder peculiar to a certain part of the body, and not ariſing from any preceding diſeaſe; in which ſenſe it is oppoſed to ſympathetic. Thus, an epilepſy is idopathic, when it happens merely through ſome fault in the brain; and ſympathetic, when it is the conſequence of ſome other diſorder.

IDIOSYNCRASY, among phyſicians, denotes a peculiar temperament of body, whereby it is rendered more liable to certain diſorders, than perſons of a different conſtitution uſually are. See the article TEMPERAMENT.

IDIOT, in the Engliſh laws, denotes a natural or fool from his birth.

A perſon who has underſtanding enough to meaſure a yard of cloth, number twenty righty, and tell the days of the week, &c. is not an idiot in the eye of the law.

In other countries, repeating the Lord's prayer ſaves a man from being reckoned an idiot.

IDOLATRY, the adoration paid to idols and falſe gods, which is due to God alone.

IDYLLION, εἰδύλιον, in ancient poetry, is only a diminitive of the word εἶδος, and properly ſignifies any poem of moderate extent, without conſidering the

the ſubject. But as the collection of Theocritus's poems were called Idyllia, and the paſtoral pieces being by far the beſt in that collection, the term idyllion ſeems to be now appropriated to paſtoral pieces. See the article PASTORAL POETRY.

So very different are our modern idyllions from thoſe of the ancients, by introducing none but allegorical ſhepherds, that a literal tranſlation of Theocritus's idyllions, however well executed, would be reliſhed only by people of taſte, and thoſe too well acquainted with the ſimplicity and manners of the ancients.

JEALOUSY, in general, denotes the fear of a rival; but is more eſpecially underſtood of the ſuſpicion which married people entertain of each other's fidelity and affection.

Bitter Waters of JEALOUSY, in Jewiſh antiquity, certain conſecrated waters, which a woman was obliged to drink, in order to clear herſelf of the crime of adultery, whereof her jealous huſband accuſed her; the conſequence of which draught was, that if innocent ſhe ſuffered no harm, but if guilty her belly ſwelled, &c.

JEARS, in the marine, a certain double tackle, or complication of pullies, whereby to raiſe the principal ſail-yards of a ſhip, particularly thoſe of the main, fore, and mizzen-ſails.

JECUR, the liver, in anatomy. See the article LIVER.

JEHOVAH, one of the Scripture names of God, ſignifying the Being who is ſelf-exiſtent, and gives exiſtence to others. See the article GOD.

JEJUNUM, in anatomy, the ſecond of the ſmall guts, ſo called becauſe it is generally found empty. This is owing to the fluidity of the chyle, the greater ſtimulus of the bile in it, and the abundance of the lacteal veſſels with which it is furniſhed. Its ſituation is in the region above the navel; it has a great many connivent glands. Its beginning is where the duodenum ends; and it terminates where theſe valves are obliterated. Its length is different in various ſubjects; but is uſually between thirteen and ſixteen ſpans.

JEOFAILE, or JEOFAYLE, in law, a term uſed for an overſight in pleading, or other proceedings in law.

JERUSALEM-ARTICHOKE. See the article HELIANTHUS.

JESUITS, or the ſociety of Jeſus, a moſt famous religious order in the Romiſh church, founded by Ignatius Loyola, a native of Guipuſcoa in Spain, who in the year 1538, aſſembled ten of his companions at Rome, principally choſen out of the univerſity of Paris, and made a propoſal to them to form a new order; when, after many deliberations, it was agreed to add to the three ordinary vows of chaſtity, poverty, and obedience, a fourth, which was, to go into all countries whither the pope ſhould pleaſe to ſend them, in order to make converts to the Romiſh church. Two years after, pope Paul III. gave them a bull, by which he approved of this new order, giving them a power to make ſuch ſtatutes as they ſhould judge convenient; on which, Ignatius was created general of the order; which in a ſhort time ſpread over all the countries of the world, to which Ignatius ſent his companions, while he ſtaid at Rome, from whence he governed the whole ſociety.

The entire ſociety is compoſed of four ſorts of members; novices, ſcholars, ſpiritual and temporal coadjutors, and profeſſed members. The novices continue ſo two years, after which they are admitted to make the three ſimple vows, of chaſtity, poverty, and obedience, in the preſence of their ſuperiors: the ſcholars add ſome ſpiritual exerciſes to their ſtudies. The principal coadjutors aſſiſt the profeſſed members, and alſo make the three ſimple vows: the temporal coadjutors, or lay-brothers, take care of the temporal affairs of the ſociety; and the profeſſed members, which compoſe the body of the ſociety, beſides the three ſimple vows, add a ſpecial vow of obedience to the head of the church in every thing relating to miſſions among idolaters and heretics. They have profeſſed houſes for their profeſſed members and coadjutors; colleges, in which the ſciences are taught to ſtrangers; and ſeminaries, in which the young jeſuits go through a courſe of philoſophy and theology. They are governed by a general, who has four aſſiſtants, and who appoints rectors, ſuperiors of houſes, provincials, viſitors, and commiſſaries. The diſcipline of theſe houſes, and eſpecially of the colleges, was regulated by Ignatius himſelf.

JET, *Gagates*, in natural hiſtory, a ſolid, dry, opake, inflammable ſubſtance, found in large detached maſſes, of a fine and regular ſtructure, having a grain like that of wood, ſplitting more eaſily horizontally than in any other direction, very light, moderately hard, not fuſible, but readily inflammable, and burning a long time with a fine greeniſh flame.

It is of a fine deep black colour, very gloſſy and ſhining, except upon its ſurface, where it has been fouled by accident. When examined by the microſcope, it is found to be compoſed of a number of parallel plates, very thin, and laid cloſely upon one another. It is not ſoluble in, nor makes any efferveſcence with acids. It ſhould be choſen of the deepeſt black, of a moderate hardneſs, very light, and ſuch as will ſplit moſt evenly in an horizontal direction; this being its great characteriſtic, by which it is diſtinguiſhed from the cannel-coal, which breaks eaſy any way.

Jet is of great uſe to perfumers, and is ſometimes preſcribed in medicine.

JET D'EAU, a French term, frequently alſo uſed with us for a fountain that caſts up water to a conſiderable height.

JETSON, JETSEN, or JETSAM, in law, is uſed for any thing thrown out of a ſhip or veſſel that is in danger of being a wreck, and which is driven by the waves on ſhore. See FLOTSON.

JEWEL, any precious ſtone or ornament beſet with them. See DIAMOND, RUBY, &c.

JEWEL-BLOCKS, among ſailors, certain pullies hung to the outer-ends or yard-arms of the top-ſail yards: they are uſed to hoiſt the ſtudding-ſails by. See the article STUDDING-SAIL.

JEWEL-OFFICE, an office belonging to the crown, that has the charge of faſhioning and weighing the king's plate, and delivering it out by warrants from the lord chamberlain.

The principal officer is the maſter of the jewel-office, who has a ſalary of four hundred and fifty pounds per annum.

JEWS, thoſe who profeſs obedience to the laws and religion of Moſes, before whom every man worſhipped God according to the inclination of his own heart.

How far the religious ceremonies of the Jews were copied from thoſe of the Egyptians, among whom they had ſo long ſojourned, or how far they were typical of ſomething future, are queſtions which we leave to be diſcuſſed by divines. But as to the religion of the modern Jews, it is a manifeſt abſurdity; ſince being without a temple, ſacrifices, &c. it cannot be conſidered as ſubſiſting any longer.

JEWISH HOURS, in chronology. See the article HOUR.

IGNIS FATUUS, in meteorology, a meteor, otherwiſe called, Will-with-a-wiſp. See the article WILL-*With-a-Wiſp*.

IGNIS GEHENNÆ, the ſame with the univerſal diſſolvent, or alkaheſt. See ALKAHEST.

IGNIS JUDICII, in our old cuſtoms, a purgation by fire. See ORDEAL.

IGNITION, in chemiſtry, the heating metals red-hot, without melting them. Lead and tin are too ſoft to bear ignition, which takes effect only in the harder metals, as gold and ſilver, but eſpecially iron.

IGNORAMUS, in law, a term ſignifying we are ignorant. This is uſed when the grand jury impannelled on the inquiſition of criminal cauſes, reject the evidence as too weak to make good the preſentment or indictment brought againſt a perſon, ſo as to bring him upon his trial by a petty jury; in which caſe they indorſe this word on the back of the bill of indictment. In conſequence of which, all further proceedings againſt the party accuſed are ſtopped, and the ſuppoſed offender is delivered without further anſwer.

IGNORANCE, *Ignorantia*, the privation or abſence of knowledge. See the article KNOWLEDGE.

IGNORANCE, in law, is a want of knowledge of the laws, which will not excuſe a perſon from ſuffering the penalty inflicted on the breach of them; for every one is obliged, at his peril, to know the laws of the land.

IGUANA, in zoology, an American ſpecies of lizard, with a long round tail, five toes on each foot, and the creſt of the throat and the dorſal future dentated.

JIB, among ſeamen, the foremoſt ſail of a ſhip, or that which is extended the furtheſt before the prow: it is, like all the other ſtay-ſails, of a triangular form, and is hoiſted from the jib-boom towards the fore-top-maſt head.

JIB-BOOM, a certain pole or ſloping maſt, which is run out on a line with the bowſprit, to bear out the jib to its proper extent: this boom can occaſionally be drawn in, which is always the caſe when they come into a harbour, to prevent breaking amongſt the ſhipping at anchor or paſſing.

ILEX, the holly tree, in botany. See the article HOLLY.

ILEX COCCIGERA, or holm oak, is of much lower ſtature than the former ſorts, and ſeldom grows to the height of a tree: this, though a native of the warmeſt parts of France, yet will endure the cold of our climate in the open air. It may be propagated in the ſame manner as the former, and deſerves a place among other ſhrubs of low growth for its curioſity, as being the plant on which the kermes are bred.

ILIAC PASSION, called alſo *Volvulus*, *Miſerere Mei*, and *Chordapſus*, in phyſic, a ſevere kind of cholic.

This diſeaſe, by the Greeks, is a violent inflammation of the inteſtine, which, unleſs ſpeedy relief be given, ſoon terminates in a gangrene, and death.

Wherefore blood muſt be plentifully drawn with great expedition, not only once, but twice, and generally thrice: then the belly is to be moved; but this is very difficult to be done, becauſe acrid cathartics cauſe too great an irritation, and are thrown up by vomit: therefore it is to be attempted by ſtimulating clyſters, and gentle cathartics, which are moſt likely to give mutual aſſiſtance to each other's operations. Anodynes too are neceſſary, but mixed with the purging medicines. Thus a very proper medicine will be a ſcruple of the cathartic extract, with one grain of the Thebaic extract; and ſome hours after, two ſpoonfuls of infuſion of ſena, with the addition of a fourth part of the tincture of ſena, to be taken either every hour, or every two hours, till the patient has had a ſufficient number of ſtools.

If this courſe prove ineffectual, it will be right to order quickſilver to be ſwallowed down; which has a two fold uſe in this caſe; to wit, by its ponderoſity, that of reſtoring the natural motion of the inteſtines, which is inverted; and by its ſlipperineſs, that of ſoftening and driving downward the ex-

excrements which ſtop the paſſage. Upon theſe accounts it is to be given in large quantities, to a pound weight at leaſt; and generally requires to be repeated. Nor ought the phyſician to uſe any long delay in trying this experiment, for fear of an actual mortification of the inflamed parts, whereby the coats of the inteſtines are deſtroyed, and the quickſilver runs into the cavity of the abdomen.

In ſhort, fomentations are of ſome ſervice, particularly warm flannels ſoaked in ſpirits of wine; or what Sydenham preſcribes, a live puppy held conſtantly on the bare belly. But an immerſion up to the breaſt in the warm bath is far more beneficial; and if the pain is not diſcuſſed, it will be proper to apply cupping-glaſſes, with ſlight ſcarifications about the navel.

The ſame method of cure is to be obſerved in that ſevere diſeaſe, by the French called *colica pictonum*, and by the Engliſh in the American iſlands, where it is very rife, the dry belly-ach: for it is a pain attended with a fever and inflammation, and moſt troubleſome coſtiveneſs. *Mead.*

ILIACUS MUSCULUS, in anatomy, a broad thick muſcle, lying on the inſide of the os ilium. It is fixed by fleſhy fibres to the internal labium of the creſt of the os ilium, to that of the ſlope between the two anterior ſpines, to the inſides of theſe ſpines, to the ſuperior half of the inſide of this bone, and to the adjacent lateral part of the os ſacrum. All theſe fibres, contracting by degrees, run obliquely towards the lower parts of the muſcular pſoas, uniting with it; and being fixed by a kind of aponeuroſis to the outſide of its tendon, all the way to the little trochanter.

ILIAD, ἰλιας, in literary hiſtory, the name of an ancient epic poem, the firſt and fineſt of thoſe compoſed by Homer.

As there was no true hiſtory before the firſt Olympiad, it is reaſonable to ſuppoſe that Homer took the ſubject of his Iliad from thoſe traditional ſtories which were handed down from father to ſon, reſpecting the Trojan war; adding ſuch other characters, allegories, and circumſtances, as were ſuitable to his deſign, which was evidently that of diſplaying to his countrymen (who were Greeks) the miſchievous effects of their too frequent diſſentions, and the benefits ariſing from a contrary conduct.

It is to be obſerved, that at the time Homer wrote this poem, and for ſome centuries before, the Grecians were divided into as many ſmall independent ſtates as they had large cities: and as their body politic and government were diſtinct and different, ſo was too often their intereſt, whence aroſe animoſities and ſometimes wars among themſelves; yet as theſe people had very powerful neighbours, and inveterate enemies, they were often obliged, notwithſtanding their own petty quarrels, to conferate themſelves together under one general for their mutual ſafety; and when they were thus united, and had no contention among them, they were generally victorious, and an over-match even for the Perſians; but on the contrary, when by their own feuds and diſſentions, their armies were divided and weakened, their enemies prevailed over them, and part of their country was deſpoiled.

Homer ſaw this, and knowing that an inſtructive leſſon on the ſubject, diſguiſhed under the allegories of an important action, and delivered in an inſinuating pleaſing manner, would do more good with ſuch a people than the moſt powerful oratory and argumentation, he compoſed his iliad for their uſe; the deſign of which is to ſhew, that unanimity and concord among princes and governors occaſioned the preſervation and proſperity of ſtates, and that diſcord brought on their deſtruction. This, therefore, is the principal moral of the poem; and this he has exemplified in the anger of Achilles and its conſequences, which forms the action and fable of the poem, which is as follows:

Several Grecian princes, independent of each other, are united againſt the Trojans, to revenge themſelves of an inſult offered to Menelaus, king of Sparta. They elect Agamemnon, brother to the injured prince, their general, who by an act of violence affronts Achilles, the moſt valiant of all the confederates; upon which this prince breaks the union, withdraws from the army, and obſtinately refuſes to fight for the common cauſe; whereupon there are contentions among the troops, who grow mutinous, and the Trojans taking advantage of the abſence of Achilles, and of their diſputes and diviſions, recover new ſpirits, deſtroy a great number of the Greeks, and preſs them ſo cloſe, that they are obliged to raiſe fortifications to ſecure their fleet, are about to quit the Phrygian coaſt, and to return home with diſhonour. Agamemnon, by the advice of the other princes, ſolicits a reconciliation with Achilles, but in vain. He continues inexorable, and refuſes them aid, even at a time when all their beſt generals were wounded, their fortifications deſtroyed, and the fleet ſet on fire; at laſt, however, he permits his deareſt friend Patroclus to fight for the Greeks in his armour, who is killed by Hector; this draws the fury of Achilles on the Trojans, and Agamemnon and he having both ſeverely ſuffered for their folly, are made friends: Achilles returning again to the army, kills Hector with his own hand, and the Trojans are vanquiſhed: ſo that in this poem, which does not extend to the deſtruction of Troy, but ends with the death of Hector, becauſe that puts an end to the anger of Achilles, and the action is complete, the poet has fully inculcated his intended moral, by ſhewing the terrible effects which enſued from a diviſion among their princes, and the good effects which attended their union and friendſhip.

To excite curioſity, and raiſe our admiration to the higheſt pitch, he has inſerted many things that

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are wonderful, and out of nature; but they are generally introduced with the pomp of celeſtial machinery, and by favour of the gods and goddeſſes, in order that they may appear probable, and obtain belief. We are alſo to obſerve, that as valour was a darling paſſion among the Greeks, he has magnified their deeds, that they might read his works with the greater pleaſure, and that the moral might be more effectually fixed upon the mind.

Homer had ſuch a comprehenſive genius, ſuch a fertile fancy, and was ſo well acquainted with perſons and things, and eſpecially with the paſſions and humours of mankind, that the ancients eſteemed him as the great high-prieſt of nature, who was admitted into her inmoſt choir, and inſtructed in her moſt ſolemn myſteries. The characters of his perſons, though very numerous, are drawn with ſo much judgment, with ſuch a ſurpriſing variety, and ſo diſtinguiſhed by their manners and ſentiments, that every one has ſomething peculiar to himſelf, by which he is diſcovered even in his ſpeeches from all the reſt.

The diſtinctions he has obſerved in the different degrees of virtues and vices are extremely exact; and the ſingle quality of courage, which he has given to moſt of his heroes, is ſo wonderfully diverſified, that it appears different in each. Thus in a fine piece of painting, where ſome particular paſſion is repreſented, every face appears affected; but the attitude and turn of the features ſhew, that each is affected in a different manner, or in a different degree.

If we may credit Strabo the hiſtorian and geographer, Homer has been as exact in his deſcription of countries and cities, as in that of his perſons: but what more particularly recommends him to readers of taſte and genius, is his amazing imagination, his fertility of invention, which is indeed the very fountain of all poetry, and diſcovers itſelf in a miraculous manner, not only in his fable, allegories, machinery, and characters, but even in his deſcriptions, images, and ſimilies, which are even bold and animated. Every thing is alive in Homer. There is little of narration; for the perſons appear, as it were, before you, and ſpeak for themſelves. He has, as Ariſtotle obſerves, found out living words, and, by daring tropes and figures, conveys his ſentiments in an unuſual and ſurpriſing manner.

In him a weapon thirſts to drink the blood of an enemy; an arrow is impatient to be on the wing; his heroes are cloathed with courage and fortitude. Even his epithets diſcover his ſtrength of invention, and in many caſes anſwer the end of elaborate deſcriptions, eſpecially when compounded in his manner, as the Cloud-compelling Thunderer, the Far-darting Phœbus, &c. Nor is the force of his invention much leſs obvious in the ſtructure of his verſe, and the dignity and harmony of his numbers, which flow from Homer with ſo much eaſe, ſays Mr. Pope, that one would "imagine he had no other care than to tranſcribe as faſt as the muſes dictated; and at the ſame time with ſo much force and inſpiring vigour, that they awaken and raiſe us like the ſound of a trumpet. They roll along as a plentiful river, always in motion, and always full; while we are borne away by a tide of verſe, the moſt rapid, and yet the moſt ſmooth imaginable.

"Thus on whatever ſide we contemplate Homer, what principally ſtrikes us is his invention. It is that which forms the character of each part of his work; and accordingly we find it to have made his fable more extenſive and copious than any other, his manners more lively and ſtrongly marked, his ſpeeches more affecting and tranſported, his ſentiments more warm and ſublime, his images and deſcriptions more full and animated, his expreſſion more raiſed and daring, and his numbers more rapid and various.

"What he writes is of the moſt animated nature imaginable; every thing moves, every thing lives, and is put in action. If a council be called, or a battle fought, you are not coldly informed of what was ſaid or done as from a third perſon; the reader is hurried out of himſelf by the force of the poet's imagination, and turns in one place to a hearer, in another to a ſpectator. The courſe of his verſes reſembles that of the army he deſcribes. They pour along like a fire that ſweeps the whole earth before it. It is, however, remarkable, that his fancy, which is every where vigorous, is not diſcovered immediately at the beginning of his poem in its fulleſt ſplendor. It grows, in the progreſs, both upon himſelf and others, and becomes on fire like a chariot wheel, by its own rapidity. Exact diſpoſition, juſt thought, correct elocution, poliſhed numbers, may have been found in a thouſand; but this poetical fire, this *vivida vis animi*, in a very few. Even in works, where all thoſe are imperfect or neglected, this can overpower criticiſm, and makes us admire even while we diſapprove. Nay, where this appears, tho' attended with abſurdities, it brightens all the rubbiſh about it, till we ſee nothing but its own ſplendor. This fire is diſcerned in Virgil, but diſcerned as in a glaſs, reflected from Homer, more ſhining than fierce, but every where equal and conſtant. In Lucan and Statius, it burſts out in ſudden, ſhort, and interrupted flaſhes. In Milton, it glows like a furnace, kept up to an uncommon ardour by the force of art. In Shakeſpeare, it ſtrikes before we are aware, like an accidental fire from heaven: but in Homer, and in him only, it burns every where clearly, and every where irreſiſtably.

"This ſtrong and ruling faculty was like a powerful ſtar, which, in the violence of its courſe, drew all things within its vortex. It ſeemed not enough to have taken in the whole circle of arts, and the whole compaſs of nature; all the inward paſſions and

and affections of mankind, to ſupply his characters; and all the outward forms and images of things for his deſcriptions; but, wanting yet an ampler ſphere to expatiate in, he opened a new and boundleſs walk for his imagination, and created a world for himſelf in the invention of fable; for that which Ariſtotle calls the ſoul of poetry, was firſt breathed into it by Homer."

ILIUM, in anatomy, the third and laſt of the ſmall guts, is ſituated principally below the navel, near the oſſa ilii; whence its name. Its length is various: ſometimes not more than fifteen, ſometimes twenty ſpans or more. Its beginning is where the valves of the jejunum ceaſe to be conſpicuous, and its end is where the larger inteſtines begin; in which place it is, in a very ſingular manner, inſerted into the left ſide of the colon. It has no other valves except that great one at the end, which is called, by many, valvula coli Bauhini: its glands are, in general, more numerous towards the end than in any other part.

ILIUM OS. See INNOMINATA OSSA.

ILLECEBRUM, in botany, a genus of plants, whoſe flower is apetalous; the cup is pentaphyllous and quinquangular, containing within it five capillary ſtamina. The fruit is an unilocular roundiſh capſule, acuminated on both ſides, including a large ſingle ſeed.

IMAGE, in a religious ſenſe, is an artificial repreſentation or ſimilitude of ſome perſon or thing, uſed either by way of decoration and ornament, or as an object of religious worſhip and veneration; in which laſt ſenſe, it is uſed indifferently with the word idol. See the article IDOLATRY.

IMAGINATION, a power or faculty of the mind, whereby it conceives and forms ideas of things communicated to it by the outward organs of ſenſe.

IMBECILITY, a languid, infirm ſtate of body; which, being greatly impaired, is not able to perform its uſual exerciſes and functions.

IMBIBING, the action of a dry porous body, that abſorbs or takes up a moiſt or fluid one: thus, ſugar imbibes water; a ſponge, the moiſture of the air, &c. See the articles MOISTURE, HYGROMETER, &c.

IMBRICATED, among botaniſts, an appellation given to ſuch leaves of plants, as are placed over one another like the tiles of a houſe.

The term imbricated is likewiſe applied to ſome of the heart ſhells, from their being ridged tranſverſely in the ſame manner.

IMITATION, in literary matters, the act of doing or ſtriving to copy after, or become like to another perſon or thing.

IMITATION, in muſic, a particular way of compoſition wherein each part is made to imitate the other, either throughout the whole piece, which is one of the kinds of canon; or only during ſome meaſures, which is a ſimple imitation.

Sometimes the motion or figure of the notes is only imitated, and that often by a contrary motion, which makes what they call a retrograde imitation.

IMMACULATE, ſomething without ſtain, chiefly applied to the conception of the holy virgin. See CONCEPTION.

IMMANENT, in logic. The ſchoolmen diſtinguiſh two kinds of actions, the one tranſient, which paſs from the agent to the patient; the other immanent, which continue in the agent. See ACT.

IMMATERIAL, ſomething devoid of matter, or that is pure ſpirit: thus God, angels, and the human ſoul, are immaterial beings. See the articles GOD, ANGEL, and SOUL.

IMMEDIATE, whatever is capable of producing an effect without the intervention of external means; thus we ſay, an immediate cauſe, in oppoſion to a mediate or remote one. See the article CAUSE.

IMMEMORIAL, in law, an epithet given to the time or duration of any thing, whoſe beginning we know nothing of.

IMMENSITY, an unlimited extenſion, or which no finite and determinate ſpace, repeated ever ſo often, can equal. See INFINITY.

IMMERSION, that act by which any thing is plunged into water, or other fluid. See FLUID.

Immerſion, in aſtronomy, is when a ſtar or planet is ſo near the ſun with regard to our obſervations, that we cannot ſee it; being, as it were, enveloped and hid in the rays of that luminary. It alſo denotes the beginning of an eclipſe of the moon, or that moment when the moon begins to be darkened, and to enter into the ſhadow of the earth; and the ſame term is alſo uſed with regard to an eclipſe of the ſun, when the diſk of the moon begins to cover it. In this ſenſe emerſion ſtands oppoſed to immerſion, and ſignifies the moment wherein the moon begins to come out of the ſhadow of the earth, or the ſun begins to ſhew the parts of his diſk which were hid before. See the article ECLIPSE.

Immerſion is frequently applied to the ſatellites of Jupiter, and eſpecially to the firſt ſatellite; the obſervation whereof is of ſo much uſe for diſcovering the longitude. The immerſion of that ſatellite is the moment in which it appears to enter within the diſk of Jupiter, and its emerſion the moment when it appears to come out.

The immerſions are obſerved from the time of the conjunction of Jupiter with the ſun, to the time of his oppoſition; and the emerſions from the time of his oppoſiton to his conjunction.

The peculiar advantage of theſe obſervations is,

that during eleven months of the year, they may be made at leaſt every other day. The perfection of this theory, and the praxis thereon, we owe to Mr. Caſſini.

IMMORTAL, that which will laſt to all eternity; as having in it no principle of alteration or corruption: thus God and the human ſoul are immortal. See the articles GOD and SOUL.

IMMUNITY, a privilege or exemption from ſome office, duty, or impoſition; as an exemption from tolls, &c.

IMMUTABILITY, one of the divine attributes, founded on the abſolute perfection of the Deity. See GOD.

IMPALED, in heraldry; when the coat of a man and his wife who is not an heireſs are borne in the ſame eſcutcheon, they muſt be marſhalled in pale; the huſband's on the right ſide, and the wife's on the left: and this the heralds call baron and feme, two coats impaled.

If a man has had two wives, he may impale his coat in the middle between theirs; and if he has had more than two, they are to be marſhalled on each ſide of his in their proper order.

IMPALPABLE, that whoſe parts are ſo extremely minute that they cannot be diſtinguiſhed by the ſenſes, particularly by that of feeling.

IMPANELLING, in law, ſignifies the writing down, or entering into a parchment, liſt, or ſchedule, the names of a jury ſummoned by the ſheriff to appear for ſuch public ſervices as juries are employed in. See the article PANNEL.

IMPARLANCE, in law, a petition in court for a day to conſider, or adviſe, what anſwer the defendant ſhall make to the plaintiff's action; and is the continuance of the cauſe till another day, or a longer time given by the court.

IMPASSIBLE, that which is exempt from ſuffering, or cannot undergo pain or alteration.

IMPASTATION, in maſonry, a term uſed for a work made of ſtuc, or ſtone, beaten and wrought up in manner of a paſte.

IMPASTING, or EMPASTING, in painting. See EMPASTING.

IMPATIENS, in botany. See the article BALSAMINA.

IMPEACHMENT, an accuſation and proſecution for treaſon and other crimes and miſdemeanors.

IMPEACHMENT *of Waſte*, is a prohibition or reſtraint from committing of waſte upon lands or tenements.

IMPEDIMENTS, in law, are ſuch hindrances as put a ſtop, or ſtay, to a perſon's ſeeking for his right by due courſe of law.

IMPENETRABILITY, in philoſophy, that property of body, whereby it cannot be pierced by another: thus, a body, which ſo fills a ſpace as to exclude all others, is ſaid to be impenetrable. See the articles BODY, EXTENSION, &c.

IMPERATIVE, one of the moods of a verb, uſed when we would command, entreat, or adviſe: thus, *go*, *read*, *take pity*, *be adviſed*, are imperatives in our language; but in the learned languages, this mood has a peculiar termination to diſtinguiſh it from others, as *i*, or *ito*, *go*; *lege*, or *legito*, *read*, &c. and not only ſo, but the termination varies, according as you addreſs one or more perſons, as *audi* and *audite*; ακουε, ακουετω, ακουετωσαν, &c.

IMPERATOR, in Roman antiquity, a title of honour conferred on victorious generals by their armies, and afterwards confirmed by the ſenate.

IMPERATORIA, maſter-wort, in botany, a plant whoſe leaves ariſe immediately from the root; the footſtalks are ſeven or eight inches long, dividing into three ſhort ones at the top, each ſuſtaining a tribbate leaf; the flower-ſtalks ariſe about two feet high, divided into two or three branches, which are terminated by umbels of white flowers whoſe petals are ſplit. The fruit is naked, round, and compreſſed, divided in two parts, and containing two oval furrowed ſeeds.

The root of this plant is fleſhy, aromatic, and has a ſtrong acrid taſte. It is reckoned cordial and ſudorific, and is an ingredient in many compoſitions.

IMPERFECT, ſomething that is defective, or that wants ſome of the properties found in other beings of the ſame kind: thus moſſes are called imperfect plants, becauſe almoſt all the parts of fructification are wanting in them; and for the like reaſon, is the appellation imperfect given to the fungi and ſubmarine plants.

IMPERFECT FLOWERS, thoſe otherwiſe called ſtamineous. See the article STAMINEOUS.

IMPERFECT NUMBERS, ſuch whoſe aliquot parts taken together, do either exceed or fall ſhort of that whole number of which they are parts: they are abundant or deficient. See the articles ABUNDANT and DEFICIENT.

IMPERFECT TENSE, in grammar, a tenſe that regards ſome preterite tenſe, or denotes the thing to be at that time preſent, and not quite finiſhed; as *ſcribebam*, *I was writing*.

IMPERIAL, ſomething belonging to an emperor or empire, as imperial crown, imperial chamber, imperial cities, imperial diet, &c.

IMPERSONAL VERB, in grammar, a verb to which the nominative of any certain perſon cannot be prefixed; or, as others define it, a verb deſtitute of the two firſt and primary perſons, as *decet*, *oportet*, &c. The impersonal verbs of the active voice end in *t*, and thoſe of the paſſive in *tur*; they are conjugated through the third perſon ſingular of almoſt all the tenſes and moods: they want the imperative

perative, instead of which we use the present of the subjunctive; as *pæniteat*, *pugnetur*; nor, but a few excepted, are they to be met with in the supines, participles, or gerunds.

IMPERVIOUS, a thing not to be pervaded, nor passed through, either by reason of the closeness of its pores, or the particular consideration of its parts.

IMPETIGO, in medicine, a name by which the leprosy of the Greeks is sometimes called. See LEPROSY.

IMPETIGO is also a species of itch attended with dry scales or scurf, and an uneasy pruriginous itching. See ITCH.

IMPETUS, in mechanics, a force with which one body impels or strikes another. See MOMENTUM, GUNNERY, &c.

IMPING, in falconry, the inserting of a feather in the wing of an hawk, in the place of one that is broken.

IMPLEAD signifies to sue or prosecute by due course of law.

IMPLEMENTS is used for all things necessary for a trade, or the furniture of an household; in which sense it is frequently used in wills, conveyances of moveables, &c.

IMPLICATION, in law, is where something is implied that is not expressed by the parties themselves in their deeds, contracts or agreements.

IMPORTATION, in commerce, the bringing merchandize into a kingdom from foreign countries; in contradistinction to exportation. See the article EXPORTATION.

IMPOSITION *of Hands*, a religious ceremony, in which the bishop lays his hands upon the head of a person, in ordination, confirmation, or in uttering a blessing. This practice is generally observed by the dissenters at the ordination of their ministers, when all the ministers present place their hands upon the head of him whom they are ordaining, while one of the body prays for a blessing on him and his future labours.

IMPOSSIBLE, that which cannot be done or effected.

A proposition is said to be impossible, when it contains two ideas, which mutually destroy each other, and which can neither be conceived nor united together in the mind: thus, it is impossible that a circle should become a square, because we conceive clearly that squareness and roundness destroy each other by the contrariety of their figure.

IMPOST, in law, signifies in general a tribute or custom; but is more particularly applied to signify that tax which the crown receives for merchandizes imported into any port or haven. See DUTY.

Some notwithstanding, distinguish imposts from customs, which last are rather the profits arising to the king from goods exported. See the article CUSTOMS.

IMPOSTS, in architecture, the capitals of pillars, or pilasters, which support arches.

An impost, sometimes called chaptrel, is a sort of plinth, or little corniche, which crowns a pier, and supports the first stone whence an arch or vault commences. The imposts are conformable to their proper orders. The Tuscan has only a plinth; the Doric has two faces crowned; the Ionic, a larmier, or crown over the two faces, and its moulding may be carved; the Corinthian and Composite have a larmier, freeze, and other mouldings.

The projectures of the imposts must not exceed the naked of the pilaster: sometimes the entablature of the order serves for the impost of the arch, and this has a very grand and stately appearance. The impost is a thing very essential to the composition of the ordonnances, insomuch that without it, in the place where the curve-line of the arch meets with the perpendicular line of the pillar, there always seems a kind of elbow.

IMPOSTHUME, in surgery, &c. the same with abscess.

IMPOTENCE, or IMPOTENCY, in general, denotes want of strength, power, or means to perform any thing.

IMPRACTICABLE CASE, in algebra, that otherwise called irreducible. See IRREDUCIBLE.

IMPRECATION, a curse, or wish that evil may befal any one. See EXECRATION.

IMPRESSION is applied to the species of objects, which are supposed to make some mark or impression on the senses, the mind, and the memory.

IMPRESSION also denotes the edition of a book, regarding the mechanical part only; whereas edition, besides this, takes in the care of the editor, who corrected or augmented the copy, adding notes, &c. to render the work more useful. See EDITOR.

IMPRISONMENT, the state of a person restrained of his liberty, and detained under the custody of another.

IMPROPRIATION, a parsonage or ecclesiastical living, the profits of which are in the hands of a layman; in which sense, it stands distinguished from appropriation, which is where the profits of a benefice are in the hands of a bishop, college, &c. though these terms are now often used promiscuously. See the article APPROPRIATION.

IMPUTATION, in general, the charging something to the account of one, which belonged to another: thus, the assertors of original sin maintain, that Adam's sin is imputed to all his posterity. See the article ORIGINAL SIN.

In the same sense, the righteousness and merits of Christ are imputed to true believers. See the article JUSTIFICATION.

IN-

INACCESSIBLE, ſomething that cannot be come at, or approached, by reaſon of intervening obſtacles, as a river, rock, &c. It is chiefly uſed in ſpeaking of heights and diſtances. See HEIGHT and DISTANCE.

INACTIVITY *of Matter*. See INERTIA.

INADEQUATE IDEA. See IDEA.

INALIENABLE, that which cannot be legally alienated or made over to another: thus the dominions of the king, the revenues of the church, the eſtates of a minor, &c. are inalienable, otherwiſe than with a reſerve of the right of redemption.

INAMELLING, or ENAMELLING. See the article ENAMELLING.

INANIMATE, a body that has either loſt its ſoul, or that is not of a nature capable of having any.

INANITION, among phyſicians, denotes the ſtate of the ſtomach when empty, in oppoſition to repletion.

INARCHING, in gardening, is a method of grafting, commonly called grafting by approach. See GRAFTING *by approach*.

INAUGURATION, the coronation of an emperor or king, or the conſecration of a prelate: ſo called from the ceremonies uſed by the Romans, when they were received into the college of augurs. See CORONATION, CONSECRATION, &c.

INCAMERATION, a term uſed in the chancery of Rome, for the uniting of lands, revenues, or other rights, to the pope's domain.

INCANTATION, denotes certain ceremonies, accompanied with a formula of words, and ſuppoſed to be capable of raiſing devils, ſpirits, &c.

INCAPACITY, in the canon-law, is of two kinds: 1. The want of a diſpenſation for age in a minor, for legitimation in a baſtard, and the like: this renders the proviſion of a benefice void in its original. 2. Crimes and heineous offences, which annul proviſions at firſt valid.

INCARNATION, in theology, the act whereby the ſecond perſon of the Holy Trinity aſſumed the human nature, viz. a true body and reaſonable ſoul, in order to accompliſh the redemption of fallen mankind. See TRINITY and REDEMPTION.

INCARNATIVES, in ſurgery, medicines which aſſiſt nature in filling up wounds or ulcers with fleſh; or rather remove the obſtructions thereto. See the article VULNERARY.

Internal incarnatives are aliments which ſupply a balſamic chyle, and conſequently generate fleſh, and produce a full or plump habit.

INCARTATION, among chemiſts, the ſame with depart. See DEPART.

INCENSE, or FRANK INCENSE, in the materia medica. See the article THUS.

INCEPTIVE, a term uſed by Dr. Wallis to expreſs ſuch moments, or firſt principles, which, though of no magnitude themſelves, are notwithſtanding capable of producing it. Thus, a point is inceptive of a line, and a line inceptive of ſurface, &c.

INCEST, the crime of venereal commerce between perſons who are related in a degree wherein marriage is prohibited by the law of the country.

INCEST SPIRITUAL, a crime committed in like manner between perſons who have a ſpiritual alliance by means of baptiſm or confirmation.

INCH, a well known meaſure of length; being the twelfth part of a foot, and equal to three barley corns in length. See FOOT and MEASURE.

INCH *of Candle*, or ſale by inch of candle. See the article CANDLE.

INCIDENCE, in mechanics and optics, denotes the direction on which one body ſtrikes on another. See ANGLE.

INCIDENT, in law, ſomething that inſeparably belongs to another: thus, a court baron is incident to a manor.

INCIDENT, in poetry, denotes much the ſame with epiſode. See EPISODE.

INCISIVE, an appellation given to whatever cuts or divides: thus, the fore-teeth are called *dentes inciſivi*, or cutters; and medicines of an attenuating nature, incidents, or inciſive medicines. See the articles TEETH and ATTENUANTS.

INCLE, a kind of tape made of linen-yarn.

INCLINATION is a word frequently uſed by mathematicians, and ſignifies the mutual approach, tendency, or leaning of two lines, or two planes, towards each other, ſo as to make an angle.

Inclination of a right-line to a plane, is the acute angle which that line makes with another right-line drawn in the plane through the point where the inclined line interſects it, and through the point where it is alſo cut by a perpendicular drawn from any point of the inclined plane.

Inclination of the axis of the earth, is the angle which it makes with the plane of the ecliptic, or the angle contained between the planes of the equator and ecliptic.

Inclination of a planet, is an arch of the circle of inclination, comprehended between the ecliptic and the plane of a planet in its orbit.

The greateſt inclination of Saturn, according to Kepler, is 2° 32′; of Jupiter, 1° 20′; of Mars, 1° 50′ 30″; of Venus, 3° 22′; of Mercury, 6° 54′. According to De la Hire, the greateſt inclination of Saturn is 2° 33′ 30″; of Jupiter, 1° 19′ 20″; of Mars, 1° 51′ 00″; of Venus, 3° 25′ 5″; of Mercury, 6° 52′ 00″.

INCLINATION *of a Plane*, in dialling, is the arch of a vertical circle, perpendicular both to the plane and the horizon, and intercepted between them.

INCLINED PLANE, in mechanics, that which makes an oblique angle with the horizon.

That an inclined plane is a mechanical power appears

Fig. 1.

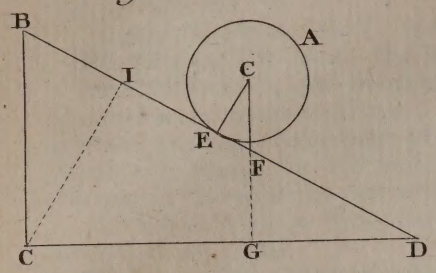


Fig. 2. Inclin'd Plane.

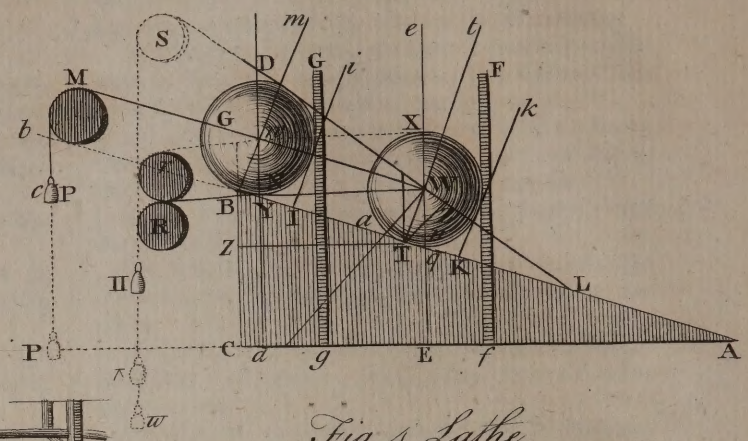


Fig. 3. Turner's Lathe and Wheel.

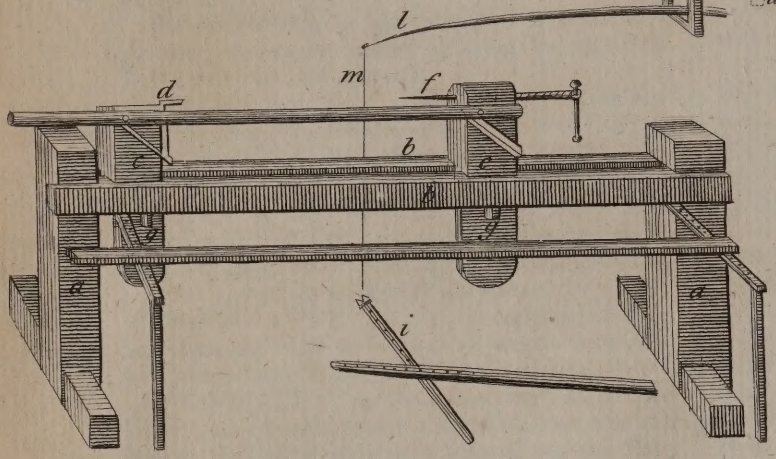


Fig. 4. Lathe.

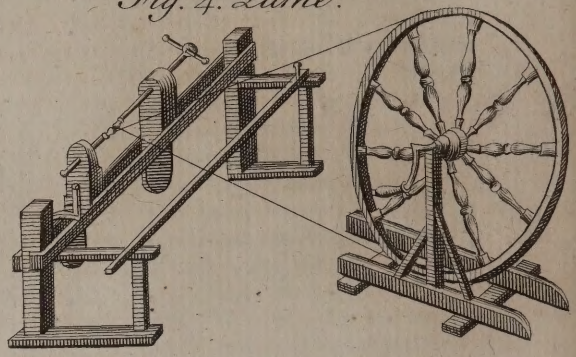


Fig. 7. Lathe for turning Oval and Rose Work.

Fig. 5. Brasiers Lathe.

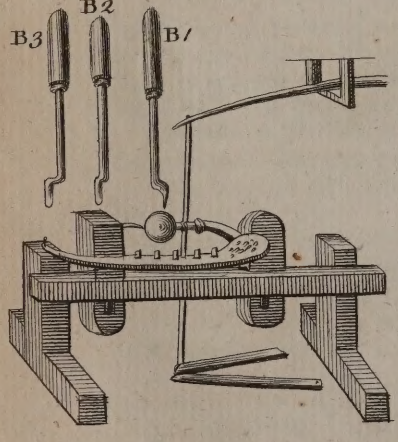
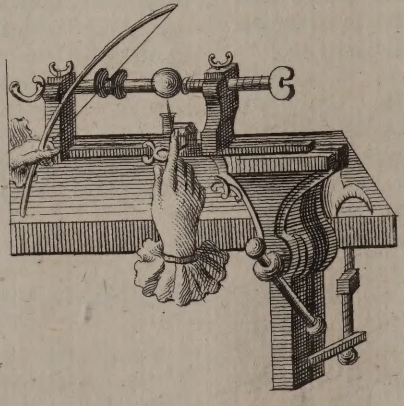
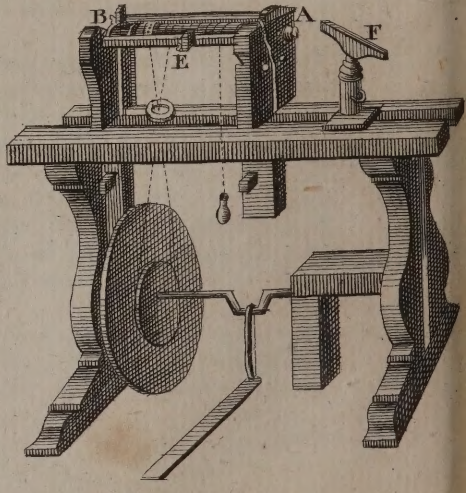


Fig. 6. An Iron Lathe for turning small Work in Metal.





pears sufficiently in its diminishing the weight of a body laid upon it, in regard to the power which holds it in æquilibrio. Let A (plate LXIV. *fig.* 1.) be a body sustained on the inclined plane B D; from the center C draw C F perpendicular to the horizon or base D C, and C E perpendicular to the plane; then C F will represent the whole weight or force of gravity of the body A, which is resolvable into the two forces C E and E F; but the force C E, being perpendicular to the plane, acts wholly upon it, and is equally re-acted on, or sustained by, the plane; the other force E F, being parallel to the plane, is that by which the body descends, or is kept from descending by an equal power acting in a contrary direction. Therefore the whole weight of the body is to the power which keeps it in æquilibrio on the plane, as C F to F E, or (because the triangles C F E and B D C are similar) as B D to B C, that is, as the length of the plane to its height.

If it should be required to lift up a very heavy body, as W or *w* (*fig.* 2.) the height C B, it would be impracticable to raise it up in the line C B without a power whose intensity is equal to that of the weight; and even in that case very inconvenient to do it, especially in building. But if an inclined plane A B be laid arising from the horizontal line A C, from whence the weight is to be raised, a less power than the weight will serve for that purpose, unless it pushes the body directly against the plane (as in the direction W T) or draws the body away from the plane (as from W towards *e*, *t*, or L) or in any direction on that side of the line E *e*.

The direction in which the body can most easily be drawn or pushed up the plane, is the line W *w* M, parallel to the plane, and passing through the center of the weight; for whether the power divides a plane *k* K (in a direction perpendicular to it) along the line W M, or the power P (by its descent to *p*) draws it in the same line, the velocity of the power will be equal to the line W *w*, the space described by the center of gravity of the weight, whilst the same weight rises only the perpendicular height Z B (=*n* W) or has the said line properly to express its velocity. If the body was a cylinder, as a rolling-stone, and the plane T *t* were to pass through the gudgeons or axis of the said stone, it is evident that the case would be the same; and as the weight P has its rope running over the roller (or upper pulley) M, the line P *p* will be the velocity of the power. Therefore, in this case, the weight (if kept in æquilibrio) will be to the power, as W *w* (=TB) to *w* Y (=BZ) or as the hypothenuse A B is to the perpendicular B C, which (by Eucl. 4, 6) are in the same proportion: and consequently, if the power be never so little increased, it will draw the weight up the plane.

That the power acts with the greatest advantage, whilst it draws in the line of direction W *w* (parallel to the plane) is evident, because if one end of the said plane of direction remaining fixed at W, the other should move towards B, or beyond it, then the body would be partly drawn against the plane, and therefore the power must be increased in proportion to the greatest difficulty of traction: and if the end *w* of the line above-mentioned should be carried to D, or beyond it, the power must be also increased, inasmuch as it endeavours to lift the body off from the plane.

If the power draws in a line of direction W B (*fig.* 2.) parallel to the base of the plane, then, in order to keep the weight W in æquilibrio by the power Π, the said power must be to the weight, as Z B to Z T, or as the perpendicular B C to the base A C of the triangle A C B. For if we suppose the pulley R at so great a distance from W, that the line of direction W R may not sensibly alter its horizontal position, whilst the body W rises the height B Z, in such manner that Π *ϖ* (=W Y, and not W *w*) will be the velocity of the power. So that the velocity of the power to that of the weight will not be as the hypothenuse to the perpendicular, as in the former case, but as the base to the perpendicular in the triangle A C B.

If the powers be increased just enough to overcome the friction of the plane and draw up the body W, let the pulley R be lifted up gradually to *r*, so as to keep the line W R parallel to itself till it comes to *w r*, and the power will be descended to *π*, when the weight is come to *w* B. But Π *π* together with the distance R *r*, is equal to Π *ϖ*, or W Y, &c. And this traction, being constantly made in the angle W B T, is the case.

INCLINERS, or INCLINING DIALS. See the article DIALLING.

INCLOSURE, in husbandry, the fence or hedge made to inclose lands. See the articles FENCE and HEDGE.

A very good inclosure may be madeof el der-sticks, or truncheons, cutten or twelve feet long, and stuck into the bank slopewise, so as to make a chequer-work. These make the speedieſt shelter of any; and when the trees are grown up, they are valuable for the turner's use. They succeed extremely well in watery places; and when planted on the banks of rivers, they prevent them from being undermined by the current.

The throwing down inclosures is an offence punishable by our ancient statutes; yet if the lord of a manor inclose part of the waste, and does not leave sufficient room for the commoners, they may break down such inclosures, or have a writ of assize.

INCOGNITIO, or INCOG. is applied to a person that is in any place where he would not be known: but it is more particularly applied to princes or great men, who enter towns or walk the streets without their ordinary train, or the usual marks of their distinction and quality.

INCOMBUSTIBLE, something that cannot be burnt or consumed by fire.

INCOMMENSURABLE, a term in geometry, used where two lines when compared to each other, have no common measure, how small soever, that will exactly measure them both. And, in general, two quantities are said to be incommensurable, when no third quantity can be found that is an aliquot part of both.

Such are the diagonal or side of a square; for though each of those lines have infinite aliquot parts, as the half, the third, &c. yet not any part of the one be it ever so little, can possibly measure the other, as is demonstrated in prop. 17, lib. x. of Euclid.

Rappus, lib. iv. prop. 17, speaks also of incommensurable angles. As to surfaces which cannot be measured by a common surface, they are said to be incommensurable in power.

INCOMMENSURABLE NUMBERS are such as have no common divisor that will divide them both equally.

INCOMPATIBLE, that which cannot subsist with another without destroying it: thus cold and heat are incompatible in the same subject, the strongest overcoming and expelling the weakest.

INCORPOREAL, a thing, or substance, which has no body; as God, angels, and the soul of man.

INCRASSATING, in pharmacy, &c. the rendering fluids thicker by the mixture of other substances less fluid, or by the evaporation of the thinner parts.

INCREMENT, and DECREMENT, the increase and decrease of a quantity. See the article SERIES.

INCRUSTATION, in surgery, the induction of a crust or eschar upon any part.

Among masons, incrustation signifies the lining or coating of a wall, either with glossy stones, rustics, marble, pottery, or stucco-work, and that either equably or in panels and compartiments.

INCRUSTED, or INCRUSTATED COLUMN, is a column consisting of several pieces, or slips of some precious marble masticated or cemented round a mould of brick, or other matter.

INCUBATION, the action of a hen, or other fowl, brooding on her eggs.

INCUBUS, or EPHIALTES, in physic, commonly called the night-mare, a disorder under which the patient cannot stir himself, but with the utmost difficulty; is seized with a numbness and sense of weight, with a dread of suffocation, and an oppression, as from some body falling suddenly upon him.

The cure consists in evacuations by phlebotomy and cathartics. The patient must be kept to a thin diet, and avoid all flatulent food.

INCUMBENT, a clerk, or minister, who is resident on his benefice: he is called incumbent, because he does, or at least ought to bend his whole study to discharge the cure of his church.

INCURVATION *of the Rays of Light*, their bending out of a rectilinear or straight course, occasioned by refraction. See REFRACTION.

INCUS, in anatomy, a bone of the internal ear. See the article EAR.

INDEFEISIBLE, or INDEFEAZABLE, a term in law, for what cannot be defeated or made void; as an indefeisible estate of inheritance, &c.

INDEFINITE, or INDETERMINATE, that which has no certain bounds, at least assignable by the human mind.

Descartes uses the word instead of infinite, in numbers and quantities, to signify a number so great, that an unit cannot be added to it; and a quantity so great, as not to be capable of any addition.

INDEFINITE, in the schools, also denotes a thing that has but one extreme; for instance, a line drawn from any point and extended infinitely; as also eternity *a parte ante*, or eternity *a parte post*.

INDEFINITE *Proposition*. See the article PROPOSITION.

INDEFINITE, in grammar, implies such nouns, pronouns, verbs, participles, &c. which are left in an uncertain indeterminate sense, and not fixed to any particular time, or other circumstance.

INDELIBLE, something that cannot be cancelled or effaced.

INDEMNITY, in law, the saving harmless; or a writing to secure one from all damage and danger that may ensue from any act. An indemnity in regard to estates, is called a warranty. See the article WARRANTY.

Act of INDEMNITY, the same with act of grace. See *Act of* GRACE.

INDENTED, in heraldry, is when the out-line of an ordinary is notched like the teeth of a saw.

INDENTED *Line*, in fortification, the same with what the French engineers call redent; being a trench and parapet running out and in, like the teeth of a saw; and is much used in irregular fortification. See FORTIFICATION.

INDENTED *Leaf*, among botanists, is one whose margin ends in horizontal points that are of the consistence of the leaf, and are separated by intermediate spaces.

INDEPENDENTS, a sect of protestants in England and Holland, so called from their independency on other churches, and their maintaining that each church or congregation has sufficient power to act and perform every thing relating to religious government within itself, and is no way subject or accountable to other churches or their deputies.

The present independents differ from the presbyterians only in their church government, in being generally more attached to the doctrines distinguished by the term orthodoxy, &c. and in administering

niſtering the Lord's ſupper at the cloſe of the afternoon's ſervice. See the article PRESBYTERIANS.

The ſeveral ſects of baptiſts are all independents with reſpect to church government.

INDETERMINATE, in general, an appellation given to whatever is not certain, fixed, and limited; in which ſenſe, it is the ſame with indefinite.

INDETERMINATE PROBLEM, in algebra, one which is capable of an indefinite number of ſolutions.

INDEX, in anatomy, the ſame with the forefinger. See FINGER.

INDEX, in arithmetic and algebra, ſhews to what power any quantity is involved, and is otherwiſe called exponent. See EXPONENT.

INDEX *of a Logarithm*, that which ſhews of how many places the abſolute number belonging to a logarithm doth conſiſt; and of what nature it is, whether an integer or fraction. Thus, in this logarith 2.523421, the number 2 ſtanding on the left hand of the point is called the index, becauſe it ſhews that the abſolute number anſwering to the above logarithm, conſiſts of three places: for the number is always one more than the index.

If the abſolute number be a fraction, then the index of the logarithm hath a negative ſign, marked thus $\bar{2}$.523421. See the article LOGARITHM.

INDEX *of a Globe*, the little ſtyle or gnomon, which being fixed on the pole of the globe, and turning round with it, points out the hours upon the hour circle. See the article GLOBE.

Expurgatory INDEX, a catalogue of prohibited books in the church of Rome.

INDIAN-SHOT, in botany. See the article CANNA.

INDICATION, in phyſic, whatever ſerves to direct the phyſician how to act.

INDICATIVE, in grammar, the firſt mood, or manner, of conjugating a verb, by which we ſimply affirm, deny, or aſk ſomething; as *amant*, they love; *non amant*, they do not love; *amas tu*, doſt thou love?

INDICATIVE *Column*. See COLUMN.

INDICTION, in chronology, a cycle of fifteen years. See CYCLE.

INDICTMENT, in law, is a bill or declaration of complaint, at the ſuit of the king, drawn up in form of law, and exhibited againſt a perſon, and afterwards preferred to the grand jury or inqueſt, who are to find whether the complaint be true or not. An indictment differs from an accuſation only in this, that the preferrer of the bill is not tied to the proof thereof, under any penalty, except there appear to be a conſpiracy.

INDIGESTION, *Indigeſtio*, a want of due coction, either in the food, the humours of the body, or excrements.

INDIGNATORIUS MUSCULUS, a muſcle of the eye, otherwiſe called abducens, and rectus exterior: it has this appellation from its drawing the eye outwards, thereby occaſioning the appearance of ſcorn. See the article EYE.

INDIGO, in commerce, a preparation of the juice of a plant, whoſe leaves are ſmall, fleſhy, and ſoft, of a greeniſh brown colour on the upper ſide, pale, and as it were ſilver-coloured underneath. This plant, by ſome called anil, or nil, has ſeveral ſlender knotty ſtalks, which ſpread into ſmall branches, clothed each with from four to ten pair of theſe leaves, and an odd one at the end: it riſes to the height of about two feet, and produces reddiſh flowers, in ſhape reſembling thoſe of broom, but ſmaller, followed by oblong pods, containing the ſeeds.

Labat has given a particular account of the culture of the plant, and the preparation of the indigo. The ground being thoroughly cleared from weeds, one of the principal points in the culture, a number of ſlaves, ranged in a line, march acroſs, making little trenches of the width of their hoes, and two or three inches deep, about a foot diſtance from each other every way: then returning, they drop ſome ſeeds in each trench, and afterwards cover them with the earth taken out. In moiſt weather, the plant comes up in three or four days; and in about two months after, it is fit for cutting: if ſuffered to ſtand till it runs into flower, the leaves become too dry and hard, and the indigo obtained from them proves leſs in quantity, and leſs beautiful: the due point in maturity is known, by the leaves beginning to grow leſs ſupple, or more brittle. In rainy ſeaſons the cutting may be repeated every ſix weeks: cutting in dry weather kills the plant, which, if that is avoided, continues to afford freſh crops for two years.

A large quantity of the herb is put into a vat or ciſtern of ſtrong maſon work, with ſo much water as is ſufficient to cover it, and ſome wood laid above to prevent its riſing up. The matter begins to ferment, ſooner or later, according to the warmth of the weather, and the maturity of the plant, ſometimes in ſix or eight hours, and ſometimes in not leſs than twenty. The liquor grows hot, throws up a plentiful froth, thickens by degrees, and acquires a blue colour inclining to violet. At this time, without touching the herb, the liquor impregnated with its tincture is let out, by cocks in the bottom, into another vat placed for that purpoſe, ſo as to be commanded by the firſt.

In the ſecond vat the liquor is ſtrongly and inceſſantly beat and agitated, with a kind of buckets fixed to poles, till the colouring matter is united into a body. A good deal of nicety is requiſite in hitting this point: if the beating is ceaſed too ſoon, a part of the tinging matter remains diſſolved in the liquor; if continued a little too long, a part of that which

had

had ſeparated is diſſolved afreſh. The exact time for diſcontinuing the proceſs is determined, by taking up ſome of the liquor occaſionally in a little cup, and obſerving whether the blue fecula is diſpoſed to ſeparate and ſubſide.

The whole being now ſuffered to reſt till the blue matter has ſettled, the clear water is let off by cocks in the ſides at different heights; and the blue part diſcharged by a cock in the bottom, into another vat: here it is ſuffered to ſettle for ſome time longer; then further drained in cloth bags, and expoſed in ſhallow wooden boxes to the air, till thoroughly dry.

The author abovementioned, from whom the whole of the foregoing account is extracted, obſerves further, that the goodneſs of the indigo depends greatly upon the age of the plant; that before it has grown fully ripe, the quantity it yields is leſs, but the colour proportionably more beautiful; that probably the ſecret of thoſe, whoſe indigo has been moſt eſteemed, is no other than cutting the herb at the time when it yields the fineſt colour; that the ſuperiority of ſome of the indigoes of the Eaſt-Indies to thoſe of America, is perhaps owing to the former being prepared more curiouſly from only the leaves of the plant; and that by beating the herb in the ſteeping vat, which has been practiſed by ſome with a view to increaſe the quantity, great part of the ſubſtance of the leaves and bark is blended with the water along with the colouring matter, and the indigo extremely debaſed.

It is ſaid that lime or lime-water is ſometimes employed in the beating vat, to promote the ſeparation of the tinging particles from the water; and that the hardneſs or flintineſs of ſome ſorts of indigo is owing to an over-proportion of this addition.

Indigo is commonly divided, from the colour which it exhibits upon breaking, into three kinds, copper-coloured, purple, and blue. It is ſaid that the dyers uſe chiefly the firſt; and the callico-printers, for this drug gives a durable ſtain to linen as well as woollen, the laſt. On what particular circumſtances theſe different appearances depend, we know not; nor is it certainly known, whether the real quality of the indigo has any connexion with them. The deepeſt and livelieſt indigo, rubbed with the nail, looks like poliſhed copper; and ſolutions of all the ſorts, made in alkaline lixivia, aſſume alike a copper-coloured ſkin upon the ſurface.

Good indigo is moderately light, breaks of a ſhining ſurface, and burns almoſt wholly away upon a red-hot iron. It is quickly penetrated by water, and reduced into a kind of paſte: a conſiderable part is at the ſame time diffuſed through the liquor, and very ſlowly ſubſides. This is probably what Labat and Hellot mean by its diſſolving in water; for no part of the indigo really diſſolves; it cannot indeed be expected that it ſhould from the proceſs by which it is obtained.

INDIVIDUAL, *Individuum*, in logic, a particular being of any ſpecies, or that which cannot be divided into two or more beings equal or alike.

INDIVISIBLE, among metaphyſicians. A thing is ſaid to be indiviſibly abſolute, abſolutely indiviſible, that is a ſimple being, and conſiſts of no parts into which it may be divided. Thus God is indiviſible in all reſpects, as is alſo the human mind, not having extenſion or other properties of body.

INDIVISIBLE *Secundum quid eſt*, indiviſible with reſpect to what is now is, a ſubſtance which, though it conſiſts of parts into which it may be divided, yet never can be be ſo divided as to remain the ſame: thus a meaſure or number is ſaid to be indiviſible, for if from a foot-line, for example, any thing is deducted, it is no more a foot-line; and if from the number three any thing is ſubtracted, it is no longer the ſame number. See the next article.

INDIVISIBLES, in geometry, the elements or principles into which any body or figure may be ultimately reſolved; which elements are ſuppoſed infinitely ſmall: thus a line may be ſaid to conſiſt of points, a ſurface of parallel lines, and a ſolid of parallel and ſimilar ſurfaces; and then, becauſe each of theſe elements is ſuppoſed indiviſible, if in any figure a line be drawn through the elements perpendicularly, the number of points in that line will be the ſame as the number of the elements; whence we may ſee that a parellelogram, priſm, or cylinder, is reſolvible into elements or indiviſibles, all equal to each other, parallel and like to the baſe; a triangle into lines parallel to the baſe, but decreaſing in arithmetical proportion, and ſo are the circles which conſtitute the parabolic conoid, and thoſe which conſtitute the plane of a circle, or ſurface of an iſoſceles cone. See the article INFINITESIMALS.

INDORSEMENT, in law, any thing written on the back of a deed, as a receipt for money received. See the article BILL.

INDUCEMENT, in law, ſignifies what may be alledged as a motive; and, in our law, it is uſed ſpecially in ſeveral caſes; as, there is an inducement to actions, to a traverſe in pleading, and to an offence committed, &c.

INDUCTION, in law, is putting a clerk or clergyman in poſſeſſion of a benefice or living to which he is collated or preſented. See the article PRESENTATION.

INDULGENCES, in the Romiſh church, are a remiſſion of the puniſhment due to ſins, granted by the church, and ſuppoſed to ſave the ſinner from purgatory. Clement VI. in his decretal, which is generally received by the church of Rome, declares, that our ſaviour has left an infinite treaſure of merits, ariſing from his own ſufferings, beſides thoſe of the bleſſed virgin and the ſaints; and that the paſtors and guides of the church, and more eſpecially the popes, who are the ſovereign diſpoſers of this trea-

ſure, have authority to apply it to the living, by virtue of the keys, and to the dead, by way of ſuffrage, to diſcharge them from their reſpective proportions of puniſhment, by taking juſt ſo much merit out of this general treaſure, as they conceive the debt requires, and offering it to God.

It was the great abuſe of indulgences that contributed not a little to the firſt reformation of religion in Germany, where Martin Luther began firſt to declaim againſt the preachers of indulgences, and afterwards againſt indulgences themſelves: for ſince that time the popes have been more ſparing in the exerciſe of this power; however, they ſtill carry on a great trade with them in the Indies, where they are purchaſed at two reals a piece, and ſometimes more.

INDULT, in the church of Rome, the power of preſenting to benefices granted to certain perſons by the pope.

INDULTO, a duty, tax, or cuſtom, paid to the king of Spain, for all ſuch commodities as are imported from the Weſt-Indies in the galleons. See the article GALLEONS.

INERTIA *of Matter*, in philoſophy, is defined by Sir Iſaac Newton to be a paſſive principle by which bodies perſiſt in their motion or reſt, receive motion in proportion to the force impreſſing it, and reſiſt as much as they are reſiſted. It is alſo defined by the ſame author to be a power implanted in all matter whereby it reſiſts any change endeavoured to be made in its ſtate.

This power then coincides with the *vis reſiſtendi*, or power of reſiſting, whereby every body endeavours, as much as it can, to perſevere in its own ſtate, whether of reſt or uniform rectilinear motion; which power is ſtill proportionable to the quantity of matter in any body: for ſince natural bodies conſiſt of a maſs of matter, that, of itſelf, is not able to induce any change in its ſtate, if bodies were once at reſt, it is neceſſary that they ſhould always remain in that ſtate of reſt, unleſs there is applied a new force to produce motion in them: but if they were in motion, the ſame energy or force would always preſerve the motion; and therefore bodies would always retain their motion, and would always proceed forward in the ſame right-line with the ſame tenor, ſince they cannot of themſelves acquire either reſt or a retardation, or a change of their direction to turn on one ſide or the other.

Since, according to this law, a body once in motion always continues in that motion, the philoſophers aſk, Why all projectiles loſe by degrees their motion? Why do they not proceed in infinitum? If motion did not of its own nature decay, a ſtone thrown at the beginning of the world, would by this time gone through an immenſe and almoſt infinite ſpace. And ſo indeed it would, if its motion had been in vacuo, or in free ſpaces, and without any gravity. But ſince all projectiles are carried either through the air, or on the rough ſurfaces of other bodies, they muſt be neceſſarily retarded: for ſince all bodies in motion muſt drive and thruſt out of its place the reſiſting air, or overcome the roughneſs of the ſuperficies upon which they are moved, they will loſe all that force and motion that is conſtantly employed in overcoming theſe obſtacles, and conſequently the motion of projectiles will be continually diminiſhed: but if there was no reſiſtanee in the medium, no roughneſs in the ſuperficies on which they were moved, no gravity that continually forces the bodies toward the earth, motion would always continue the ſame, without any retardation at all. So in the heavens, where the medium is exceedingly rare, the planets do continue their motions for a very long time; and upon ice, or any other very ſmooth ſurface without any roughneſs, heavy bodies in motion are not ſoon brought to reſt.

INFALLIBLE, what cannot deceive, nor be deceived.

The word is Latin, and formed of *in*, taken privately, and *fallo*, to deceive.

INFAMOUS, in general, denotes ſomething notoriouſly contrary to virtue or honour.

The word is derived from the Latin *in*, and *fama*, report.

INFAMOUS, in law, denotes a perſon of no repute in the world. There are two kinds of infamy; ſome perſons being infamous *de jure*, or ſtigmatized by public judgments; others are infamous *de facto*, as being of a ſcandalous profeſſion, as a catchpole, hangman, informer, &c.

INFANT, *Infans*, in medicine, denotes a young child. See the articles CHILD and DELIVERY.

INFANT, in law, ſignifies a perſon under the age of one and twenty.

INFANTE and INFANTA, all the ſons and daughters of the kings of Spain and Portugal, except the eldeſt; the princes being called infantes, and the princeſſes infantas.

INFANTRY, in military affairs, denotes the whole body of foot-ſoldiers. See the articles FOOT and SOLDIERS.

INFECTION, among phyſicians, the ſame with contagion. See CONTAGION.

INFERNAL-STONE, *Lapis infernalis*. See the article LAPIS.

INFINITE, that which has neither beginning nor end: in which ſenſe God alone is infinite. See the article GOD.

Infinite is alſo uſed to ſignify that which has had a beginning, but will have no end, as angels and human ſouls. This makes what the ſchoolmen call *infinitum a parte poſt*; as, on the contrary, by *infinitum a parte ante*, they mean that which has an end but had no beginning.

INFINITE, in mathematics, are ſuch quantities as

as are either greater or ſmaller than any aſſignable one, being the ſame with indefinite or indeterminate, to which no certain limits are preſcribed.

The doctrine of infinites has given occaſion for many diſputes; but the true ſtate of the caſe is this: So long as we reaſon upon wrong ſuppoſitions, we muſt never expect to arrive at truth; but the nearer our ſuppoſitions are to truth, the nearer will be the concluſion; and if theſe ſuppoſitions be infinitely near the truth, the errors in the concluſion will be infinitely ſmall, which being at laſt thrown out of the account, the concluſion will be the ſame as if we had proceeded upon principles accurately true. This is the true riſe of infinitely ſmall quantities in all mathematical computations, and the true reaſon for rejecting them, when the operation is over. But it may be reaſonably demanded, How do we know that theſe infinitely ſmall errors in the concluſion ariſe from ſimilar errors in the premiſes? And the anſwer is, becauſe theſe two ſorts of errors have ſo mutual a dependence one upon an another, that one cannot be made to vaniſh, but the other will neceſſarily vaniſh with it. If it be further demanded, What the wrong ſuppoſitions are from which theſe infinitely ſmall errors ſpring? We anſwer, in the firſt place, the ſuppoſing magnitudes to have quantity, which in reality have none at all, but have entirely loſt it, either by running into infinity on the one hand, or into nothing on the other. Thus, if we ſuppoſe the point D to actually coincide with the angular point C (pl. LXIV. *fig.* 3.) the line D C will not only comparatively, but abſolutely be equal to nothing; that is, it will be no line at all, nor can any uſe be made of it; but by allowing the ſaid line to have ſome quantity, though extremely ſmall, or leſs than any that can be aſſigned, we tacitly ſuppoſe the point D not to be actually in the angular point C, but infinitely near it.

A quantity, after it is reduced to nothing, ceaſes to be a quantity; and if 0 have no quantity, neither can its reciprocal $\frac{1}{0}$, or any magnitude expreſſed by it, be ſaid to have any: but the reciprocal of nothing ſignifies a magnitude infinitely great in the ſtricteſt ſenſe of the word, and can no more be ſaid to have quantity than abſolute nothing can; and to compare ſuch magnitudes in reſpect of their quantity, which actually have none, is contrary to the definition both of ratios, and the object of proportion: nay, we know not whether the greateſt part, if not all, the difficulties that are ſaid to attend the idea of infinity, and our inability to comprehend it ought not rather to be charged upon the abſurdity of comparing things together which in their own natures are incapable of all compariſon. It is ſaid indeed that infinite parallelopipeds, ſtanding perpendicular upon finite baſes, and upon the ſame plane, are in proportion as their baſes; which is true; but this is not comparing magnitudes in reſpect of the quantity they have not, but in reſpect of the quantity they have; one of theſe parellelopipeds may be ſaid to be broader or thicker than another, though not higher. Thus, if r be any quantity whereof the multiples $2r$ and $3r$ are taken, $2r$ may be ſaid to be to $3r$ as 2 to 3, whether r be finite or infinitely great or ſmall; nay, though r ſhould ſignify an impoſſible quantity; as $\sqrt{-1}$, $\sqrt{-2}$, &c. but then the quantity of this proportion does not depend upon the quantity r, but upon the coefficients 2 and 3: but we muſt here take notice however, that if r be actually infinite, we mean in the ſtricteſt ſenſe of the word, by $2r$ and $3r$ muſt then be meant, not quantities twice or thrice as big as r, in the ſame reſpect wherein it is infinite, but r twice or thrice taken, which is no way abſurd; for if it be poſſible for any one infinite quantity to exiſt, that is not every way infinite, it will be as poſſible for others to exiſt of the ſame kind, independently of the former: a parallelopiped, that is infinitely extended only as to its length, and that both forwards and backwards, may however receive any addition, or be increaſed or diminiſhed in any proportion in reſpect of its finite dimenſions, but not in reſpect to its infinite dimenſions; and this is all the proportion we can conceive infinite quantities capable of. See *Philoſophical Tranſactions*, N°. 195.

That lines or quantities may continually decreaſe, and yet never become nothing, may be eaſily ſhewn in the following manner.—Let M C L K (*fig.* 4.) be an indefinite right line, P a given point out of that line; from P draw P C B perpendicular to M C L K, and of any length at pleaſure; from P draw P E, P F, P I, &c. obſerving always to make the ſegments D E, T F, L I, &c. of theſe lines conſtantly equal to C B: from the points E, F, I, &c. let fall upon M C K the perpendiculars E G, F H, I K, &c. It is very evident that each following perpendicular is ſhorter than any of the preceding ones; and it is as evident, that were the number of them ever ſo great, the laſt perpendicular would be of a finite length, becauſe its correſponding hypotheneuſe does, by the hypotheſis, form a finite angle with the indefinite line M C L K, and does alſo conſtantly riſe above it.

Mathematicians, and more eſpecially thoſe who underſtand this ſubject, are, generally ſpeaking, reſerved enough upon it, and chuſe rather to be deficient than redundant in their expreſſions upon theſe occaſions; not from any diffidence in their own principles, but knowing very well how liable matters of this nature are to be drawn into diſputes by ſuch as lie upon the catch, and make it their chief buſineſs to oppoſe the truths which they themſelves could never have diſcovered, nor perhaps will ever be able to underſtand.

INFINITE *Series*. See SERIES.

INFIRMARY, a kind of hoſpital, where the weak and ſickly are properly taken care of. See the article HOSPITAL.

INFLAMMABILITY, that property of bodies, which diſpoſes them to kindle, or catch fire. See the articles FIRE, FLAME, HEAT, &c.

INFLAMMATION, in ſurgery and medicine, is defined to be a preſſure and attrition of the red arterial blood, ſtagnating in the ſmalleſt canals, produced by the motion of the reſt of the blood, thrown into a violent and forcible commotion, by means of a fever.

This definition of an inflammation is taken from its cauſes. Others define it from its ſymptoms to be a ſpecies of a tumour attended with a burning heat, pain, redneſs, reſiſtance, and a continual pulſation and pricking. See TUMOUR.

Inflammations are either external, being ſuch as fall properly under the buſineſs of ſurgery, and are cured by manual operations and topical remedies; or internal, being ſuch whoſe cure is to be expected chiefly from the uſe of internal remedies. See the article FEVER.

General Criſes and Cure of INFLAMMATIONS. Inflammations terminate variouſly, according to their different degrees of violence, the cauſes from whence they ariſe, the parts which they effect, and the particular conſtitution of the patient, with ſeveral other circumſtances which alſo preſage to us what ſhall be the end of the inflammation. But the ſeveral ways wherein an inflammation terminates are chiefly four. It is either 1. ſo diſperſed and reſolved as to vaniſh without leaving any conſiderable injury in the part affected, and which afterwards recovers its former vigour, and is of all others, the beſt courſe it can take; or elſe, 2. the inflammation ſuppurates, and degenerates into an abſceſs, ſo as to leave ever after ſome damage in the organ; or elſe, 3. the inflammation degenerates into a gangrene, or ſphacelus; or, laſtly, into a hard tumour, commonly called a ſchirrous, which grows more compact in the part affected, as the inflammation remits or goes off.

As to the reſolution and diſperſion of an inflammation, that is uſually practicable, where it is only of a milder kind, in a ſound habit of body, when the blood is not yet too viſcid nor vehement in its motion. See the article DISPERSION.

But ſuppuration follows, when the inflammation is more violent, the circulation more rapid, but yet the maſs of blood ſomewhat temperate, and without much acrimony: the treatment of an inflammation that terminates in a ſuppuration, the reader will find delivered under the articles SUPPURATION, ABSCESS, &c.

When the forementioned ſymptoms are much more violent, and when the blood is at the ſame time more acrimonious and rapid than it ought to be, the inflammation generally terminates in a gangrene. See the article GANGRENE.

But if the inflamed part be full of glands, and the blood very thick, glutinous, and inſpiſſated, the ſmall blood veſſels are then ſo ſtrongly ſtuffed up with glutinous blood, that they are compacted together, the parts loſe their ſenſation, and are converted into an hard tumour, which is thence called a ſcirrhus. See the article SCIRRHUS.

INFLAMMATION *in the Breaſts*, a diſorder moſt incident to child bearing women, and almoſt conſtantly happens a few days after their delivery.

If the milk ſhould be propelled too plentifully and forcibly into the breaſt, which at ſuch times frequently happens; and if the mother ſhould then be ſeized with cold, fear, anger, or a ſudden perturbation of mind, the ſanguiferous and lactiferous veſſels being thence obſtructed, the breaſts muſt then become inevitably tumified, which will be attended with great heat, redneſs, reſiſtance, and violent pain. The ſame accident often happens to women that give ſuck even a long time after their lying-in, and is ſometimes the caſe of thoſe who have no milk, all proceeding from the cauſes already mentioned; and Heiſter gives us an inſtance of a man's breaſt being inflamed by means of a great fright. Theſe inflammations do not, according to that author, always happen to be equally intenſe and violent; for ſometimes it ſeizes the whole breaſt; ſometimes only one ſide; and at other times occupies only a ſmall part of the breaſt: ſometimes the inflammation lies very near the ſkin; at other times very deep; and at one time it has urgent ſymptoms, and at another, it ſits eaſy on the part.

This diſorder may be ſpeedily removed in women of condition, and ſuch as do not ſuckle their children, if ſome of the plaſter of ſperma ceti ſpread on linen be applied warm all round the breaſt ſoon after parturition; being perforated in the middle, to tranſmit the papilla or nipple; the acceſſion of the milk being alſo repelled by a very ſtrait bandage. Among the internal remedies, the moſt proper are ſuch as bring down the lochia puerperarum, when they do not flow in ſufficient plenty of themſelves; the principle remedies for this purpoſe are the eſſence of myrrh, amber, the eſſence of ſaffron, elixir proprietatis, &c. Laſtly, with reſpect to the proper drink, it muſt be carefully obſerved to diminiſh the quantity of milk by the ſmallneſs and poverty of the meat and drink, upon which account the patient ſhould be recommended to drink ſmall broth, tea, or the like watery liquors: and if the mother be deſirous of ſuckling the infant, there can be no better preſervative againſt the inflammations of the breaſts. But when the inflammation is fixed, the cure muſt be attempted either by diſperſion or ſuppuration, for the method of which ſee DISPERSION and SUPPURATION.

But it often happens that the tumour will neither yield to diſperſion nor ſuppuration, and is in danger of turning to a ſcirrhus, or cancer, the patient muſt be kept in good ſpirits, and the plaſter of

ſperma

ſperma ceti be conſtantly retained on the tumour, by which means it will probably either grow leſs, or elſe vaniſh.

INFLAMMATION *of the Bladder*, that attended with an acute, burning, preſſing pain, in the region of the pubes, a fever, and a continual teneſmus, or deſire of going to ſtool, and a perpetual ſtriving to make water.

Other ſymptoms of this diſeaſe are a rumbling of the bowels, griping pains, great anxiety of the præcordia, difficult breathing, want of appetite, and vomiting, coldneſs of the extreme parts, a hard, quick, unequal, contracted pulſe, inquietude, and ſometimes convulſions. There is another kind which is more ſuperficial, and is either rheumatic or eryſipetalous, in which the fever is more eaſily and ſpeedily cured, by promoting a diaphoreſis; and perſons in years, who are affected with the ſcurvy, gout, rheumatiſm, or violent head-achs, are moſt ſubject to it, eſpecially if they catch cold from a north wind. The former ariſes commonly from the ſtoppage of the menſes, bleeding piles, or other uſual ſanguinary evacuations, and not ſeldom from a virulent gonorrhœa, unſkilfully ſuppreſſed by aſtringents; or when treated by medicines of too ſharp and hot a nature.

This diſeaſe is mortal, if it terminates in an ulcer, or mortification: the latter is immediate death.

The cure muſt be attempted, ſays Hoffman, with bleeding in the foot, if a ſuppreſſion of the menſes or hæmorrhoidal flux be the cauſe. If it proceeds from the ſcurvy, &c. recourſe muſt be had to gentle diaphoretics, diluents, and remedies which obtund the acrimony of the humours, ſuch as decoctions of the root of ſcorzonera, china, ſkirrets, and fennel. Alſo infuſions in the manner of tea of the tops of yarrow, flower of mallows, winter cherries, and ſeed of daucus, made with milk, and ſweetened with ſyrup of marſh-mallows. To theſe may be added emulſions of the four cold ſeeds. If the patient is coſtive, manna will be proper with antimonial nitre, to which rhubarb may be joined, as occaſion requires. If the diſeaſe is violent, diaphoretic powders with nitre, in a larger proportion than ordinary, as alſo five grains of ſaffron, and two of camphire, with the emulſions aforeſaid. External antiſpaſmodics, and gentle diſcutients will be proper; for which purpoſe it was Hoffman's method to apply bladders, filled with a decoction of emollient flowers. If the teneſmus and difficulty of urine ariſe from ſpaſms, there is nothing better than the vapours of a decoction in milk of the flowers of melilot, elder, chamomile, and mallows, and the tops of yarrow. This decoction may be put into a cloſe-ſtool, and the patient ſit over it.

INFLAMMATION *of the Brain*. See PHRENSY.

INFLAMMATION *of the Diaphragm*. See the article PARAPHRENITIS.

INFLAMMATION *of the Eyes*. See the article OPHTHALMIA.

INFLAMMATION *of the Fauces*. See the article QUINSEY.

INFLAMMATION *of the Inteſtines*, according to Boerhaave, is an inflammation contracting the inteſtines, and ſtopping up the paſſage through them; attended with a vehement, fixed, burning pain, which is irritated by things taken inwardly.

When the inflammation is in the upper part of the inteſtines, the ſtomach will be greatly diſtended with wind. When the pain is exaſperated, it produces convulſions of the diaphragm and abdominal muſcles, vomiting, and painful inflations, with rumblings and ſharp griping pains, which may bring on the iliac paſſion, or twiſting of the guts. Hoffman ſays, that when there is a burning pain in the abdomen, with a preternatural heat of the whole body, as alſo a quick pulſe, loſs of ſtrength, anxiety and inquietude, the ſeat of the diſeaſe may juſtly be ſuſpected to be in the inteſtines. If the pain is above the navel, and below the ſtomach, attended with a fever, nauſea, and reaching, it is a ſign that that part of the colon is affected which lies beneath the ſtomach, and is extended from the right to the left ſide. If the pain lies in the right hypochondrium, under the ſpurious ribs, it ſhews that part of the colon to be inflamed where it joins with the ilium. When the complaint is on the left ſide, under the loins, where the pſoas muſcle is placed, it is a ſign that the colon, and that part of the meſentery joined thereto, is the ſeat of the diſeaſe, eſpecially when it adheres to the peritonæum: but when the pain is in the middle of the abdomen about the navel, it ſhews the ſmall guts are certainly affected; in all which caſes, the pain is ſuppoſed to be attended with a fever.

Arbuthnot adviſes, that this diſeaſe be carefully diſtinguiſhed from a colic, proceeding from a cold cauſe; becauſe what is good for the latter is poiſon in the former. It muſt have a ſpeedy remedy, or it will ſoon, according to that writer, end in the iliac paſſion, or a mortification. Beſides copious bleeding, he thinks there is ſcarcely any other method of cure, than fomenting and relaxing the bowels with emollient liquids taken warm, both by the mouth and in clyſters, and this every hour: warm fomentations, or young, vigorous, and ſound animals applied to the body are extremely beneficial.

Boerhaave directs, that the patient ſhould only be nouriſhed with broth, in which gentle detergent roots have been boiled.

After bleeding and clyſters, if the pain continues violent, Hoffman is of opinion, that there will be no manner of danger in giving opiates, by which means the excruciating pain will be alleviated, and the ſpaſms appeaſed, and a breathing ſweat will follow. When this is done, and the fever abated, there will be no occaſion to continue the dilating,

re-

relaxing, and moiſtening medicines, but rather the nervous and corroborating; ſuch as the preparations of amber, eſpecially the ſalt and tincture; the former of which may be given in a bolus from ſix to ſixteen grains, and the latter from twenty to eighty drops, in any convenient vehicle.

If the patient ſurvives three days, and the acuteneſs of the pain abates with a chilneſs and ſhivering throughout the whole body, it is a ſign of a ſuppuration; and within fourteen days the impoſthume will break, and if it falls into the cavity of the abdomen, it will corrupt the whole maſs of fluids, putrify the viſcera, and turn to an aſcites; whence the patient will die of a conſumption. In this caſe, Boerhaave and Arbuthnot recommend whey and chalybeat waters, as likely to prove moſt beneficial. The impoſthume may turn either to a gangrene or ſcirrhus, both which are mortal.

INFLAMMATION *of the Kidneys.* See the article NEPHRITIS.

INFLAMMATION *of the Liver.* When the liver is inflamed, it compreſſes the ſtomach, diaphragm, and the neighbouring viſcera of the abdomen; it ſtops the circulation of the fluids, hinders the generation and excretion of the gall, and all digeſtion; it produces a great many bad ſymptoms, as the jaundice, with all the diſeaſes depending thereon. See HEPATASIS.

A fever, an inflammation, and pungent pain on the region of the liver, and diaphragm, a tenſion of the hypochondria, yellowneſs of the ſkin and eyes, and a ſaffron-coloured urine, are ſigns of an inflammatory diſpoſition of the liver. See JAUNDICE.

This diſeaſe terminates as other inflammations; being cured by reſolution, concoction, and excretion, of the morbid matter; or it terminates in an abſceſs, ſcirrhus, or gangrene. See ABSCESS, &c.

During the firſt ſtate, Arbuthnot tells us, that a warm regimen and ſaffron, which ſome reckon a ſpecific, are improper. On the other hand, that cooling reſolving liquors, taken inwardly, as whey with ſorrel boiled in it, outward fomentations, and frequent injections of clyſters, bathing and frictions, relax and render the matter fluid. Honey, with a little rheniſh wine and vinegar, the juices and jellies of ſome ripe garden fruits, and thoſe of ſome lacteſcent plants, as endive, dandelion, and lettuce, are reſolvent. Violent purging hurts; gently relaxing the belly relieves, diluents with nitrous ſalts are beneficial, or tamarinds boiled in warm water, or whey. The feveriſh matter is often carried off by urine, and therefore diuretics, not highly ſtimulating, are proper.

If the inflammation be recent, extremely violent, and without any ſigns or hopes of reſolution, concoction, and excretion, Boerhaave adviſes, that the caſe be treated with the ſame cautions and remedies as are directed in pleuriſies, and other ſimilar inflammatory diſorders; ſuch remedies only excepted, as the ſituation of the part affected cannot admit of, except only, that all antiphlogiſtic fluids, either drank or injected by clyſters, are particularly ſerviceable in the caſe before us.

INFLAMMATION *of the Lungs.* See the article PERIPNEUMONY.

INFLAMMATION *of the Pleura.* See the article PLEURISY.

INFLAMMATION *of the Stomach* is known by a burning, fixed, and pungent pain in the ſtomach, which is exaſperated at the inſtant any thing is taken into it, and is ſucceeded by a moſt painful vomiting and hiccough. There is, beſides, an inward heat, anxiety, and a tenſive pain about the præcordia, an acute continual fever, great thirſt, difficult breathing, inquietude, toſſing of the body, coldneſs of the extreme parts, a hard, contracted, quick, and ſometimes unequal, pulſe. In the medical eſſays, we have an inſtance in this diſeaſe being attended with a hydrophrobia. See the article HYDROPHOBIA.

Boerhaave ſays, that this diſeaſe, if not ſuddenly cured, is generally mortal: therefore, that as ſoon as it is diſcovered, plentiful bleeding is neceſſary; that the patient's drink ſhould be very ſoft, antiphlogiſtic, and emollient; and alſo that clyſters of the ſame kind ſhould be adminiſtered.

Arbuthnot adviſes, that the patient ſhould totally abſtain from every thing that has acrimony in it; even the cooling nitrous ſalts, which are beneficial in other inflammations, irritate too much. Vomits, cordials, and ſpirituous liquors, are little better than poiſon: milk generally curdles. Aliments muſt be given frequently, and by a ſpoonful at a time, for any diſtention increaſes the inflammation. A thin gruel of barley, oatmeal, whey, with a very little ſugar or honey, or chicken broths, are proper aliments: whey emulſions, barley-water, and emollient decoctions are proper drinks. If poiſons of the cauſtic kind, or metallic medicines ill prepared, cauſe the inflammation, oily fat things are proper, as new milk, cream, oil of ſweet almonds, or oil of olives taken often and plentifully, according to Hoffman. If in the cholera morbus an inflammation is apprehended, he adviſes abſorbents and burnt hart's horn, with gelatinous decoctions of calves and neats feet, or hartſhorn-jellies, and water-gruel. Outwardly he recommends the following liniment as uſeful in all caſes; take oil of ſweet-almonds, two ounces; camphire, one dram; make a liniment, with which anoint frequently the præcordia, applying a hot linen cloth over it. The following epithem he recommends as an excellent diſcutient and ſudorific. Take of the vinegar of roſes, two ounces; ſpirit of wine camphorated, two drams; tincture of ſaffron, and tincture of caſtor, of each one dram; nitre, half a dram: let this epithem be applied warm to the region of the ſtomach.

If there happens an impoſthume, honey, and even

honey of roſes, taken inwardly, is, according to Arbuthnot, a good cleanſer; and decoctions of comfrey-roots, healing.

INFLAMMATION *of the Womb or Uterus*, appears from extraordinary heat and a fixed pain in the groin, with an acute fever, a pain in the loins and belly, an inflation of the abdomen, a ſtimulus to make water and to go to ſtool, heat, and a difficulty of urine.

Other ſymptoms, according to Aſtruc, are a tumor, pain, heat, tenſion of the hypogaſtric region, redneſs of the os uteri, and great heat of the vagina. If the fore part of the uterus is affected, there is a dyſury; if the back part, a teneſmus; frequent faintings and cardialgia, a burning fever; or, if the inflammation is violent, a lipyria, in which the external parts or extremities are cold, and the internal burn, and the pulſe is imperceptible; a delirium and phrenſy; the breaſts ſwell, in proportion as the inflamed uterus.

Hoffman diſtinguiſhes this diſeaſe into the ſuperficial and more profound. He ſays, that it is eaſily formed in child-bed women, and frequently accompanies the milk-fever, and may be cured in a few days if rightly managed. But that when it is more intenſe, and attended with grievous ſymptoms without remiſſion, it kills on the ſeventh, ninth, or eleventh day; a white miliary fever generally ſupervenes, which is the worſt omen, as it ſhews a mortification of the uterus. See the article MILIARY FEVER.

INFLAMMATORY DISEASES. To theſe may be referred the ſeveral diſeaſes mentioned in the preceding article, either attended with a fever, or leſſer inflammation without a fever; beſides all chronic diſorders ariſing from inflammations, the chief of which are old coughs, conſumptions, and the rheumatiſm, without a fever. See COUGH.

INFLAMMATORY FEVERS are diſtinguiſhed into two ſtages; the firſt, whilſt the pulſe continues hard, in which it is proper to bleed; the ſecond, when the inflammatory ſymptoms ſtill remaining, the pulſe is too low for that evacuation; in this ſtate bliſters are the chief remedy, and which, except in a few ſingular caſes, are not to be uſed ſooner. If the bliſters are large, it is better to apply them gradually, than many at a time. See FEVER and INFLAMMATION.

Point of INFLECTION. When a curve AFK (plate LXIV. *fig.* 5.) is partly convex, and partly concave, to a right line AB or point B; the point F dividing the convex from the concave part, or the end of the one, and the beginning of the other, is called the point of inflection, when the curve being come to F, continues its courſe towards the ſame parts; and the point of retrogreſſion, when the curve returns back again towards the place of its beginning.

Let us ſuppoſe the curve AFK to have the right line AB as a diameter, and the ordinates PM, EF, &c. parallel to each other. Now if you draw the ordinate FE from the point F, and the tangent FL; alſo another ordinate MP from the point M in the concave part AF of the curve, likewiſe a tangent MT; then it is evident that, in curves having a point of inflection, while the abſciſs AP conſtantly increaſes, the part AT of the diameter, intercepted between the vertex of the diameter A and the point T, where the tangent meets the diameter, does likewiſe increaſe until the point P falls in E, after which it continually decreaſes; therefore AT muſt become a maximum AL, when the point P falls in E, the point ſought.

In thoſe curves that have a point of retrogreſſion, the part AT continually increaſes, and the abſciſs AP till the point T coincides with L, and afterwards it continually decreaſes; whence AE muſt be a maximum, when the point T coincides with L. Now call AE, x; EF, y; then will $AL = \frac{y\dot{x}}{\dot{y}} - x$, and the fluxion of this will be $\frac{\dot{y}\dot{y}\dot{x} - y\dot{x}\ddot{x}}{\dot{y}\dot{y}} - \dot{x}$, ſuppoſing $\dot{x}$ invariable; which (being divided by $\dot{x}$ the fluxion of AE) muſt be equal to nothing, or infinite: whence $-\frac{y\ddot{y}}{\dot{y}\dot{y}} = 0$, or infinity; and ſo multiplying by $\dot{y}\dot{y}$, and dividing by $-y$, there comes out $\ddot{y} = 0$, or infinite. Now, with this laſt expreſſion, and the general equation of a curve, the point of inflection or retrogreſſion F may be found: for the nature of the curve AFK being given, we ſhall have a value of $\dot{y}$ in $\dot{x}$, and putting that value into fluxions with $\dot{x}$ conſtant, we ſhall obtain a value of $\ddot{y}$ in terms of $\dot{x}\dot{x}$; which being made equal to 0, and afterwards to infinity, by means thereof, in either of theſe ſuppoſitions, we may find AE ſo expreſſed, that its correſpondent ordinate EF ſhall interſect the curve in the point of inflection or retrogreſſion F.

Let the ordinates BM, BF, BM, of the curve AFK, all meet in the ſame point B: if any ordinate BM (*fig.* 6.) be drawn, and the tangent MT meeting BT (*fig.* 7.) perpendicular to BM in the point T; and if m (*fig.* 8.) be taken infinitely near M, and the ordinate Bm, tangent mt, the perpendicular Bt to Bm meeting MT in O, be all drawn: then ſuppoſing the ordinate BM, becoming Bm to increaſe, it is plain, in the concave part of the curve, that Bt is greater than BO; and in the convex part the ſame is leſs. So that under the point of inflection or retrogreſſion F, Ot muſt change from negative to poſitive.

This being premiſed, about the center B deſcribe the ſmall arches MR, TH, and there will be formed the ſimilar triangles mRM, MBT, THO, and the little ſimilar ſectors BMR, BTH. Now put

put BM $=y$, MR $=\dot{x}$, then mR $(\dot{y})$: RM $(\dot{x})$ :: BM (y) : BT $=\frac{y\dot{x}}{\dot{y}}$: MR $(\dot{x})$: TH $=\left(\frac{\dot{x}\dot{x}}{\dot{y}}\right)$ :: TH $\left(\frac{\dot{x}\dot{x}}{\dot{y}}\right)$: HO $=\frac{\dot{x}\dot{x}\dot{x}}{\dot{y}\dot{y}}$. Now take the fluxion of BT $\left(\frac{y\dot{x}}{\dot{y}}\right)$ with $\dot{x}$ invariable, and there will arise Bt — BT or Ht $=\frac{\dot{x}\dot{y}\dot{y}-y\dot{x}\ddot{y}}{\dot{y}\dot{y}}$; and therefore OH+H$t$ or Ot $=\frac{\dot{x}^3+x\dot{y}^2-y\dot{x}\ddot{y}}{\dot{y}^2}$. Whence multiplying by $\dot{y}^2$, and dividing by $\dot{x}$, the expreſſion $\dot{x}^2+\dot{y}^2-y\ddot{y}$ muſt be nothing or infinite in the point of inflection or retrogreſſion F. Now, by the nature of the curve given, we ſhall have values of $\dot{y}$ in $\dot{x}$, and of $\ddot{y}$ in $\dot{x}^2$, which being ſubſtituted in $\dot{x}^2+\dot{y}^2-y\ddot{y}$, there will be produced a quantity, which being made equal firſt to nothing, and afterwards to infinity; by means thereof we may get ſuch a value of BF, that if a circle may be deſcribed from B, with the ſame as a radius, it ſhall cut the curve AFK (*fig.* 5.) in the point of inflection or retrogreſſion F.

Example 1. Let AFK (*fig.* 9) be a curve, the right-line AB being a diameter of it, and let the relation of any abſciſs AE (x) to its correſponding ordinate EF (y) be expreſſed by this equation, $ax^2=yx^2+a^2y$. It is required to find ſuch an expreſſion for AE, that the ordinate EF ſhall interſect the curve AFK in the point of inflection F.

The equation of the curve gives $y=\frac{ax^2}{x^2+a^2}$, and therefore $\dot{y}=\frac{2a^3x\dot{x}}{x^2+a^2}$, and by taking the fluxion of this quantity with $\dot{x}$ conſtant, there will ariſe $\frac{2a^3\dot{x}^2\times\overline{x^2+a^2}^2-8ax^2\dot{x}^2\times\overline{x^2+a^2}}{\overline{x^2+a^2}^4}$, which being made equal to nothing, and divided by $2a^3\dot{x}^2\times\overline{x^2+a^2}$, will produce $x^2+a^2-4x^2=0$. Whence AE $(x)=\frac{a}{\sqrt{3}}$.

If $\frac{1}{3}aa$ be put for its equal xx in the equation of the curve $y=\frac{ax^2}{x^2+a^2}$, we ſhall have $y=\frac{a}{4}$; ſo that the point of inflection F may be determined without ſuppoſing the curve AFK to be deſcribed.

If AC be drawn parallel to the ordinates EF, and made equal to the given right-line a, and CG be drawn parallel to AB, the ſame will be an aſymptote to the curve AFK. For if x be made infinite, we may take xx for $xx+aa$, and therefore the value of y will then become equal to a.

Example 2. Let AFK (*fig.* 10.) be the conchoid of Nicomedes, and the point P the pole, the the right-line BC the aſymptote. It is required to find the point of inflection F; the nature of the curve being ſuch, that a right-line PF, drawn from any point F in it to the pole P, meeting the aſymptote BC in D, the part DF thereof is always equal to a given and conſtant quantity a.

Draw PA perpendicular, and EF parallel to BC, alſo DL parallel to BA. Put BE $=x$, EF $=y$, then by the ſimilar triangles DLF, PEF, DL (x) : LF $(\sqrt{a^2-x^2})$ :: PE $(b+x)$: EF $(y)=\frac{b+x\times\sqrt{a^2-x^2}}{x}$

The fluxion of this will be $\dot{y}=\frac{x^3\dot{x}+a^2b\dot{x}}{x^2\sqrt{a^2-x^2}}$. Now if you take the fluxion of it again, and make the ſame equal to nothing, there will ariſe $\frac{2a^4b-a^2x^3-3a^2bx^2\times\dot{x}^2}{a^2x^3-x^5\times\sqrt{a^2-x^2}}=0$, which may be reduced to $x^3+3bx^2-2a^2b=0$; and one of the roots thereof will be the quantity of BE ſought.

If $a=b$, the equation aforegoing will become $x^3+3ax^2-2a^3=0$, which divided by $x+a$, gives $xx+2ax-2aa=0$; and thence x or BE equal to $\sqrt{3a^2}-a$.

INFLECTION, in grammar, the variation of nouns and verbs, by declenſion and conjugation. See DECLENSION and CONJUGATION.

INFLEX LEAF, among botaniſts, one whoſe point bends inward, towards the ſtem of the plant. See the article LEAF.

INFLUENCE, a quality ſuppoſed to flow from the heavenly bodies, either with their light or heat; to which aſtrologers idly aſcribe all ſublunary events.

IN FORMA PAUPERIS, in law. See the article FORMA.

INFORMATION, in law, is nearly the ſame in the crown-office, as what in our other courts is called a declaration.

INFORMER, a perſon that informs againſt or proſecutes another, upon any penal ſtatute.

INFORMIS, ſomething irregular in its form, or figure. See the articles FIGURE and FORM.

Hence, *ſtellæ informes*, in aſtronomy, are ſuch of the fixed ſtars as are not reduced into any conſtellation. See the articles CONSELLATION and STAR.

INFRALAPSARIANS, in church-hiſtory, an appellation given to ſuch predeſtinarians, as think the decrees of God, in regard to the ſalvation and damnation of mankind, were formed in conſequence of Adam's fall. See PREDESTINATION.

INFRASCAPULARIS, in anatomy, one of the depreſſor-muſcles of the arm, which has its origin from the whole internal ſurface of the ſcapula, and its termination in the interior part of the humerus. See the article DEPRESSOR.

INFRASPINATUS, in anatomy, one of the abductory-muſcles of the arm, which has its origin in the cavity below the ſpine of the ſcapula. See the article ABDUCTOR.

INFUNDIBILIFORM, an appellation given by

by botaniſts to thoſe flowers whoſe corollæ are monopetalous and funnel-ſhaped, having a narrow tube at one end, and gradually widening towards the limb or mouth. There are two kinds of theſe flowers, one the figure of a cone, and the other plain or flat, ſomewhat like a ſaucer, and thence called hypocrateriform; of the firſt kind is bugloſs, and of the laſt form is turnſole, with many other genera.

INFUSION, in pharmacy, a method of obtaining the virtues of plants, roots, &c. by ſteeping them in a hot or cold liquid.

INGANNO, in muſic, is when having done every thing proper for ending a cadence, a mark of ſilence is placed inſtead of the final, which the ear naturally expects, and is deceived. See CADENCE.

INGOT, a maſs of gold or ſilver, melted down and caſt in a mould, but not coined or wrought. See GOLD and SILVER.

INGREDIENTS, in pharmacy, whatever ſimple medicine enter the compoſition of a compound one

INGRESS, in aſtronomy, ſignifies the ſun's entering the firſt ſcruple of one of the four cardinal ſigns, eſpecially Aries.

INGRESS, EGRESS, and REGRESS, in law, words frequently uſed in leaſes of lands, which ſignify a free entry into, a going out of, and returning from ſome part of the premiſes leaſed to another.

INGROSSER, one who buys up great quantities of any commodity, before it comes to market, in order to raiſe the price.

INGROSSER alſo ſignifies a clerk or perſon who copies records, deeds, or other inſtruments of law, on ſkins of parchment.

INGUEN, in anatomy, the ſame with what is otherwiſe called groin, or bubes. See PUBES.

INGUINAL, in anatomy, &c. any thing belonging to the groin. Hence,

INGUINAL HERNIA is a hernia in that part, called by ſurgeons bubonocele. See BUBONOCELE.

INHARMONICAL RELATION, in muſic, is much the ſame with diſcord.

INHERITANCE, a perpetual right or intereſt in lands, inveſted in a perſon and his heirs.

INHIBITION, a writ to forbid a judge's proceeding in a cauſe that lies before him.

INHUMATION, in chemiſtry, a method of digeſting ſubſtances, by burying the veſſel in which they are contained in horſe-dung or earth. See the article DIGESTION.

INJECTION, in ſurgery, the forcibly throwing certain liquid medicines into the body by means of a ſyringe, tube, clyſter-pipe, or the like.

Anatomical INJECTION, the filling the veſſels with ſome coloured ſubſtance, in order to make their figures and ramifications viſible.

INITIATED, in antiquity, a term chiefly uſed in ſpeaking of perſons who were admitted to a participation of the ſacred myſteries among the heathens. See the article MYSTERY.

INJUNCTION, in law, is a writ or kind of prohibition granted in ſeveral caſes; and for the moſt part grounded on an interlocutory order or decree, made in the court of chancery or exchequer for ſtaying proceedings either in courts of law, or eccleſiaſtical courts.

INJURY, any wrong done to a man's perſon, reputation, or goods. See the articles ASSAULT, TRESPASS, &c.

INK, *Atramentum*, a black liquor generally made of an infuſion of galls, copperas, and a little gum-arabic.

Compoſition of common Black INK. — "Take one gallon of ſoft water, and pour it boiling hot on one pound of powdered galls, put into a proper veſſel; ſtop the mouth of the veſſel; and ſet it in the ſun in ſummer, or in winter where it may be warmed by any fire; and let it ſtand two or three days. Add then half a pound of green vitriol powdered; and having ſtirred the mixture well together with a wooden ſpatula, let it ſtand again for two or three days, repeating the ſtirring; when add further to it five ounces of gum-arabic diſſolved in a quart of boiling water; and, laſtly, two ounces of alum; after which the ink ſhould be ſtrained through a a courſe linen cloth for uſe."

The galls ſhould be good, or the ink will fail; as it very frequently does from an error in this point. The marks of their goodneſs is, the appearing of a bluiſh colour, and feeling heavy. Where they are light in weight, and of a whitiſh brown colour, without any blue, they ſhould be rejected; or a greater proportion ſhould be uſed.

In moſt of the recipes for the making of ink, gum-arabic is ordered to be put undiſſolved into the mixture of water, galls, and vitriol; but, however common, it is certainly a very injudicious practice; for as the gum-arabic is with ſome difficulty diſſolved in ſimple water, and much more ſo in ſuch as is acidulated by ſalts like the vitriol, and clogged likewiſe with the ſolid part of the galls, it is certainly much better to make a ſolution of it in part of the water of which the ink is to be formed, previouſly to its being commixed with the other ingredients; which would otherwiſe, in ſpite of the moſt frequent ſtirings, keep it at the bottom of the veſſel, and prevent its being ever wholly freed from them, and diſſolved.

Boiling either the infuſion of the galls, or the mixture after the addition of the vitriol, has likewiſe been frequently ordered, and practiſed: but it is not only needleſs, but injurious to the preparation of the ink; as it can have no effect on the vitriol, beſides conducing to the ſolution of it, which is is eaſily effected, in the proportion of water proper

per to be uſed, without any heat; and with reſpect to the galls, their tinging power reſiding in an eſſential oil that is volatile, and will riſe with leſs heat than that of boiling water, it is neceſſarily leſſened by the evaporation; and conſequently, though more of it may be extracted from the galls, yet leſs will be retained in the fluid, than if infuſion with a gentle heat be uſed, inſtead of decoction.

Preparation of Red-writing INK.—"Take of the raſpings of Brazil-wood a quarter of a pound, and infuſe them two or three days in vinegar, which ſhould be colourleſs, where it can be ſo procured. Boil the infuſion then an hour over a gentle fire; and afterwards filter it, while hot, through paper, laid in an earthen cullender. Put it again over the fire, and diſſolve in it, firſt half an ounce of gum-arabic, and afterwards of alum and white ſugar, each half an ounce."

Care ſhould be taken that the Brazil-wood be not adulterated with the Braziletto or Campeachy, commonly called peachy-wood, which is moſtly the caſe when it is ground; and though a very detrimental fraud, in all inſtances of the application of Brazil-wood to the forming bright red colours, cannot yet be perceived after the mixture of the raſpings, but by trial in uſing them; it is therefore much the beſt way, when it is wanted for purpoſes like this, to procure the true Brazil-wood in pieces, and to ſcrape it with a knife, or raſp it with a very bright file; but all ruſt of iron muſt be carefully avoided, by which means all poſſibility of ſophiſtication is of courſe prevented.

Red-ink may likewiſe be prepared by the above proceſs, of white-wine inſtead of vinegar; but it ſhould be ſour, or be diſpoſed to be ſo; otherwiſe, a third or fourth of vinegar ſhould be added, in order to its taking the ſtronger tincture from the wood. Small-beer has been ſometimes uſed for the ſame purpoſe, but the ink will not be ſo bright; and when it is uſed, vinegar ſhould be added, and the quantity of gum-arabic diminiſhed, and the ſugar wholly omitted.

*Preparation of Red-*INK *from Vermilion.*—"Take the glair of four eggs, a tea-ſpoonful of white-ſugar or ſugar-candy beaten to powder, and as much ſpirit of wine; and beat them together till they be of the conſiſtence of oil: then add ſuch a proportion of vermilion as will produce a red colour, ſufficiently ſtrong; and keep the mixture in a ſmall phial, or well ſtopped ink-bottle for uſe. The compoſition ſhould be well ſhaken together before it be uſed."

Inſtead of the glair of eggs, gum-water is frequently uſed: but thin ſize made of iſinglaſs with a little honey, is much better for the purpoſe.

*Indian-*INK, is a black pigment brought hither from China, which on being rubbed with water, diſſolves, and forms a ſubſtance reſembling ink, but of a conſiſtence extremely well adapted to the working with a pencil; on which account, it is not only much uſed as a black colour in miniature painting, but is the black generally made uſe of for all ſmaller drawings in chiaro obſcuro, or where the effect is to be produced from light and ſhade only.

The preparation of Indian-ink, as well as of the other compoſitions uſed by the Chineſe as paints, is not hitherto revealed on any good authority; but it appears clearly from experiments, to be the coal of fiſh-bones, or ſome other vegetable ſubſtance, mixed with iſinglaſs ſize, or other ſize; and moſt probably, honey, or ſugar-candy, to prevent its cracking. A ſubſtance, therefore, much of the ſame nature, and applicable to the ſame purpoſes, may be formed in the following manner:

"Take of iſinglaſs ſix ounces, reduce it to a ſize, by diſſolving it over the fire in double its weight of water; take then of Spaniſh-liquorice one ounce, and diſſolve it alſo in double its weight of water, and grind up with it an ounce of ivory-black: add this mixture to the ſize while hot; and ſtir the whole together till all the ingredients be thoroughly incorporated: then evaporate away the water in balneo mariæ, and caſt the remaining compoſition into leaden moulds greaſed, or make it up in any other mould."

The colour of this compoſition will be equally good with that of the Indian-ink: the iſinglaſs ſize, mixed with the colours, works with the pencil equally well with the Indian-ink: and the Spaniſh-liquorice will both render it eaſily diſſolvible on the rubbing with water (to which the iſinglaſs alone is ſomewhat reluctant) and alſo prevent its cracking and peeling off from the ground on which it is laid.

INLAYING, the art of marquetry. See MARQUETRY.

INNATE IDEAS, thoſe ſuppoſed to be ſtamped on the mind, from the firſt moment of its exiſtence, and which it conſtantly brings into the world with it: a doctrine which Mr. Locke has abundantly refuted. See the article IDEA.

INNOCENTS DAY, a feſtival of the Chriſtian church, obſerved on December 28, in memory of the maſſacre of the innocent children by the command of Herod, king of Judea; who, being alarmed at hearing that an infant was born king of the Jews, and imagining that his own kingdom was in danger, ſent orders to have all the children ſlain that were in Bethlehem, and the adjacent country.

The Greek church in their calendar, and the Abiſſinians of Ethiopia in their offices, commemorate fourteen thouſand infants on this occaſion.

INNOMINATA OSSA, in anatomy, three bones, which compoſe the extreme part of the trunk of a human body. Theſe, though ſingle in adults, are in infants three perfectly diſtinct bones, each of which has its peculiar name; the upper one is called the ileum; the anterior one, the os pubis, or os pectinis;

pectinis; and the poſterior one, the os pubis, or os iſchium. Theſe are joined by the intervention of a cartillage, as it were, in the middle of that ſingular cavity called the acetabulum, and continue viſibly diſtinct to the age of puberty; after which they coaleſce, and form one entire bone ſo perfectly, that there is not the leaſt veſtige remaining that they ever were ſeparate.

INNUENDO, a word that was frequently uſed in declarations of ſlander, and law pleadings, when theſe were in Latin, in order to aſcertain a perſon or thing before-mentioned; but now, inſtead of the word innuendo, we ſay, meaning ſo and ſo.

INOCULATION, in medicine, the art of tranſplanting a diſtemper from one ſubject to another, by inciſion, particularly uſed for engrafting the ſmall-pox. See the article Pox.

The deſign of this operation is to communicate by art a milder ſpecies of the ſmall-pox to the infant or adult patient, than that received by the natural infection; and this by engrafting ſome of the variolus matter, in order to which a ſmall inciſion is to be firſt made with a ſcalpel or lancet, through the ſkin of the arm; and having inſerted a ſmall particle of the purulent matter, taken from a mild kind of the pock, the little wound is then to be dreſſed with ſome dry lint, and covered with a plaſter. After the operation, the patient muſt conſtantly keep his chamber, the air of which ſhould be moderately warm, and his diet regulated by ſome prudent phyſician, by which means this diſorder will ſhew itſelf in ſeven or eight days, without any malignant ſymptoms; and if aſſiſted by a proper regimen, and a moderate warmth, it uſually runs through its ſeveral ſtages. When the patient has once had the diſorder this way, though ever ſo mild, it is certain, from experience, that they never have it again; and therefore the opinion of thoſe ſeems to be well grounded, who think that the propagation of the ſmall-pox by inoculation might be of general uſe and benefit to mankind in preſerving the lives of ſome, and the moſt important members of others, as the face, eyes, hearing, viſcera, &c.

Hiſtory informs us, that the diſorder was this way propagated many hundred years ago, among the Greeks, Turks, and Chineſe; whereas it is but of late years that the Europeon nations have come into it, among which the Engliſh ſeem to have approved and followed it moſt. The experiment ſucceeded ſo well in the hands of the Britiſh phyſicians, that king George I. countenanced the ſame in all his dominions, and from thence the practice prevailed with ſucceſs in Germany, particularly in the dominions of Hanover.

INOCULATION, or budding, in gardening, a kind of grafting practiſed in the ſummer months on ſeveral kinds of ſtone fruits, as peaches, nectarines, cherries, plumbs, apricots, &c. alſo upon oranges, jaſmines, and various other ſorts of plants, which ſucceed better by this practice than the common methods of grafting. In order to perform which, being provided with a ſharp knife having a flat haft made for the purpoſe, as alſo with the cuttings of the tree intended to be propagated, proceed to make choice of a ſmooth part of the ſtock intended to be inoculated; if deſigned to be dwarf, five or ſix inches from the ground, but if a ſtandard, it ſhould be budded at the height of five and a half or ſix feet; then with your knife make an horizontal cut acroſs the rind of the ſtock, and from the middle of that cut make a ſlit downwards about two inches in length, being careful not to cut deeper than the thickneſs of the bark, leſt the ſtock is wounded; then having the cutting ready, cut off the leaf from the bud, leaving the footſtalk remaining; cut the bud off lengthways, ſomewhat longer than the ſlit in the ſtock, with part of the wood to it; this done, with your knife ſlip the wood from the bark with a ſudden jerk, and obſerve whether the eye of the bud is left or not, for thoſe buds which loſe their eyes in ſtripping are uſeleſs; then with the handle of the knife gently raiſe the bark on each ſide of the ſlit in the ſtock, and inſert the bud therein, obſerving to place it ſmooth between the rind and wood of the ſtock, cutting off that part of the rind of the bud which may happen to be too long for the ſlit made in the ſtock; ſo having exactly fitted the bud to the ſtock, tie them cloſely round with wetted ſtrong baſs, taking care not to bind round the eye of the bud, which ſhould be left open. In about three weeks or a month the buds will require to be looſened of the bandage, which if not done in time will be very injurious to them, but not to be intirely diveſted of the binding, as it is not amiſs to ſlightly tie them again, which will prevent the bark of the ſtock from flying open, as ſometimes happens, whereby the bud is much injured, if not entirely deſtroyed.

The March following, the ſtock ſhould be cut off about three inches above the place of inoculation, ſloping it the contrary way to the bud; this length is of uſe to faſten the ſhoot which proceeds from the bud, which otherwiſe might be blown out by ſtrong winds: but the autumn following, it ſhould be cut cloſe juſt above the bud, that the place of amputation may the more readily be barked over.

The time for inoculation is from the middle of June to the latter end of Auguſt, according to the ſeaſon and the forwardneſs of the different ſorts of trees intended to be budded, which muſt be known by trying if the buds will ſeparate from the wood eaſily. The firſt ſort of fruit commonly inoculated is the apricot, and the laſt the orange; although the orange is commonly budded in Auguſt, it is very proper to try the operation in July, which I have done with ſucceſs; and thoſe ſtocks which miſcarry may be budded the ſucceeding month, or

even

even in September; but let it be done when it will, it is proper to put them in a gentle heat, giving plenty of water, by which means their ſucceſs will be but little dubious.

In doing this work it will be neceſſary to take the opportunity of cloudy moiſt weather, as the bud and ſtock will more readily unite, being more replete with juices than in hot dry weather, when the ſtock will perſpire ſo faſt as to leave the buds deſtitute of moiſture.

INORDINATE PROPORTION is where there are three magnitudes in one rank, and three others proportional to them in another, and you compare them in a different order. Thus, ſuppoſe the numbers in one rank to be 2, 3, 9; and thoſe of the other rank 8, 24, 36; which are compared in a different order, viz. 2 : 3 :: 24 : 36; and 3 : 9 :: 8 : 24. Then rejecting the mean terms of each rank, you conclude 2 : 9 :: 8 : 36.

INOSCULATION, in anatomy, the ſame with anaſtomaſis. See ANASTOMASIS.

INQUEST, in law, ſignifies an enquiry made by a jury, in a civil or criminal cauſe, by examining witneſſes. See the article JURY.

INQUIRENDO, in law, an authority given to one or more perſons, to enquire into ſomething for the advantage of the king.

INQUISITION, in law, a manner of proceeding by way of ſearch or examination uſed on the king's behalf, in caſes of out-lawry, treaſon, felony, ſelf-murder, &c. to diſcover lands, goods, and the like, forfeited to the crown.

INQUISITION, in the church of Rome, a tribunal in ſeveral Roman-catholic countries, erected by the popes for the examination and puniſhment of heretics.

INQUISITORS, in law, perſons who have power by their office to make inquiry into certain caſes; as ſheriffs, and coroners on view of the body.

INROLLMENT, in law, is regiſtering any lawful act, as a ſtatute or recognizance acknowledged, a deed of bargain and ſale, &c. in the rolls of chancery, king's bench, common pleas, or exchequer, at the huſtings of Guildhall, London, or at the quarter-ſeſſions.

INSCONSED, in the military art, part of an army that have fortified themſelves with a ſconce or ſmall fort, in order to defend ſome paſs, &c.

INSCRIBED, in geometry. A figure is ſaid to be inſcribed in another, when all its angles touch the ſides or planes of the other figure. See HEXAGON, PENTAGON, &c.

INSCRIPTION, a title or writing carved, engraved, or affixed to any thing, to give a more diſtinct knowledge of it, or to tranſmit ſome important truth to poſterity.

INSECTS, *Inſecta*, in natural hiſtory, a ſmaller kind of animals, that commonly are exſanguinous.

The word is Latin, and derived from *in*, and *ſeco*, to cut, becauſe in ſome inſects, as ants, the body ſeems divided into two; or becauſe the bodies of ſeveral of them, as worms, &c. conſiſt of divers rings, which are a ſort of inciſure.

As to the generation of inſects, the world is now generally convinced that they are not bred of corruption, but *ex ovo*, though the contrary was believed by the ancients.

Malpighi, Swammerdam, and Redi, have abundantly confuted the doctrine of equivocal generation, as well as the chimerical transformation of the caterpillar into the butterfly; and have ſhewn, that all the members of the butterfly were incloſed under the nympha or ſkin of the caterpillar, as the parts of a plant are in the ſeed.

Inſects take particular care to depoſit their eggs or ſemen in ſuch places where they may have a ſufficient incubation, and where the young, when hatched, may have proper food till they can ſhift for themſelves. Thoſe whoſe food is in the water, lay their eggs there: thoſe to whom fleſh is a proper food, in fleſh; and thoſe to whom the fruits or leaves of vegetables are food, are accordingly depoſited there, but conſtantly the ſame kind in the ſame tree. As for others that require a greater degree of warmth, they are provided by the parent with ſome place in or about the body of other animals, as the feathers of birds, hair of beaſts, ſcales of fiſh, in the noſe; in the fleſh, nay ſome in the bowels of man, and other creatures. And as for others, they make them neſts, by digging into the earth, wood, &c. carrying in and ſealing up proviſions that ſerve for the production of their young, and for their food when produced.

There is obſerved in flies, butterflies, &c. a kind of glue, by which the female faſtens her eggs to the bearing buds of trees, &c. ſo as not to be hurt by rain or froſt.

Mr. Andry, in his Treatiſe *de la generation des vers dans le corps de l'homme*, takes notice, that the ancients were miſtaken in denying that inſects breathed, on account of their wanting lungs; for modern obſervations convince us, that inſects have a greater number of lungs than any other animals; they alſo thought that they had no blood, as many of them had no red liquor like ours; but it is not the colour, but the uſe of the liquor, that is to be regarded. They alſo believed that they had no hearts; whereas our microſcopes now diſcover that, when inſects have ſeveral lungs, they have alſo ſeveral hearts; and this in particular is obſervable in ſilk-worms, who have a continued chain of hearts from the head almoſt to the extremity of the tail; and, as is apparent from ſeveral inſects, who give ſigns of life, long after they are divided into ſeveral parts.

In-

Inſects want no parts that are either neceſſary or convenient for their uſe, or to render them complete in their kind. Some affirm that earth worms, and thoſe round-tailed worms, which are found in the inteſtines of men, horſes, &c. as alſo ſnails and horſe-leeches, are hermaphrodites; but that ſuch worms as become flies, and that ſilk-worms, are not ſo, being of no ſex, but neſts full of real animals, which in time come out with wings.

INSIDIANT DISEASES, thoſe which ſhew no ſymptom, but lie concealed in the body, ready to break forth on the leaſt provocation, as it were by ſurprize.

INSITION, in gardening, the ſame with grafting. See GRAFTING.

INSOLATION, in chemiſtry, the ſuffering matters to ſtand and digeſt in the heat of the ſun, inſtead of that of a furnace. See the articles FIRE and HEAT.

INSOLVENT, a term applied to perſons unable to pay their debts. See the articles DEBT and DEBTOR.

INSPIRATION, *Inſpiratio*, the conveying certain ſupernatural notices to the ſoul. This is ſuch an overpowering impreſſion made of any propoſition upon the mind by God himſelf, as gives an indubitable evidence of the truth and divinity of it.

INSPIRATION, in phyſic, that part of reſpiration whereby the air is drawn into the lungs, and ſtands contradiſtinguiſhed from expiration.

This admiſſion of the air depends immediately on its elaſticity, when the cavity of the breaſt is enlarged by the elevation of the thorax and abdomen, and particularly by the motion of the diaphragm downwards. This dilatation of the breaſt does not draw in the air, though it be a condition abſolutely neceſſary to inſpiration, but it is an actual intruſion of the air into the lungs.

INSPISSATING, INSPISSATION, or CONDENSATION, in pharmacy, the reducing a liquor to a thicker conſiſtence by evaporating the thinner parts. See INCRASSATING.

INSTALLMENT, the inſtating a perſon in any dignity.

The word is derived from the Latin *inſtallo*, which is compounded of *in*, and *ſtallum*, a ſeat in a church, bench in a court of juſtice, &c.

It chiefly denotes the induction of a dean, prebendary, or other eccleſiaſtical dignitary, into the poſſeſſion of his proper ſeat in a cathedral church. This is ſometimes called inſtallation.

INSTALLMENT likewiſe denotes the ceremony, whereby the knights of the garter are placed in their rank in the chapel of St. George at Windſor.

INSTANT, ſuch a part of duration wherein we perceive no ſucceſſion, or it is that which takes up the time of an idea in our minds.

The ſchoolmen diſtinguiſh three kinds of inſtants; a temporary, a natural, and a rational inſtant.

Temporary inſtant is a part of time immediately preceding another: thus the laſt inſtant of a day precedes, immediately and really, the firſt inſtant of the following day.

Natural inſtant is what we otherwiſe call a priority of nature, which obtains in things that are ſubordinated in acting, as firſt and ſecond cauſes, or cauſes and their effects: for the nature of things requires, that if there be a ſecond cauſe there muſt be a firſt; and that there muſt be a cauſe, if there be an effect. See CAUSE.

Rational inſtant is not any real inſtant, but a point which the underſtanding conceives to have been before ſome other inſtant, founded on the nature of the thing which occaſioned it to be conceived: for inſtance, if God made ſeveral things voluntarily, which he could otherwiſe have let alone, there is a reaſonable foundation to conceive God ſuch as he is in himſelf, before he had made any of theſe voluntary determinations: but as there was no real inſtant when God had not formed any determination, this inſtant is called a rational inſtant, by way of oppoſition to an inſtant of time.

INSTAURATION, the re-eſtabliſhment or reſtauration of a religion, a church, or the like, to its former ſtate.

INSTEP, in the manege, is that part of a horſe's hind leg which reaches from the ham to the paſtern joint; and which, when the horſe is in his natural poſture of ſtanding, ſhould be large, flat, and in a perpendicular line with the ground: for when the inſteps do not ſtand perpendicularly, it is a certain ſign of weakneſs either in the reins or hinder quarters.

INSTINCT, an appellation given to the ſagacity and natural inclinations of brutes, which ſupplies the place of reaſon in mankind. See the articles REASON and BRUTE.

INSTITUTES, in literary hiſtory, a book containing the elements of the Roman law, and conſtitutes the laſt part of the civil law. See the article CIVIL LAW.

INSTITUTION, in general, ſignifies the eſtabliſhing or founding ſomething.

INSTRUMENT, in general, whatever is ſubſervient to a cauſe in producing any effect.

A common caſe of mathematical inſtruments contains ſeveral compaſſes, a ſector, ſcale, drawing-pen, and protractor. See the articles COMPASSES, SECTER, SCALE, &c.

INSTRUMENT, in law, ſome public act, or authentic deed, by which any truth is made apparent, or any right or title eſtabliſhed in a court of juſtice. See the article DEED.

INSULATED, *Inſulatus*, in architecture, an appellation given to ſuch columns as ſtand alone, or free

free from any contiguous wall, &c. like an iſland in the ſea, whence its name.

INSULT, *inſultus*, in medicine, ſignifies the acceſs of the paroxyſm of intermitting diſeaſes.

INSULT, in the art of war, the ſame with aſſault. See ASSAULT.

INSURANCE, or ASSURANCE, a contract or ſecurity, which is commonly called policy, given by one or more perſons, whereby they oblige themſelves, in conſideration of a ſum of money paid down, to make good ſhips, merchandizes, houſes, &c. to the value of that for which the premium is received, in caſe of loſs by ſtorm, pirates, fire, &c.

We have in London ſeveral offices of inſurance from fire, which are erected into corporations, as the Royal Exchange aſſurance, the Sun-fire-office, the Hand-in-Hand fire-office, the London-aſſurance, the Phœnix-office, &c. ſome for houſes, others for goods, and ſome for both.

There are alſo offices wherein private merchants grant inſurances for ſhips, and theſe are called inſurance brokers.

We have alſo aſſurances for life, by virtue of which, when the perſon aſſured dies, a ſum of money, according as he inſured, becomes payable to the perſon in favour of whom the policy of aſſurance was granted. See the article POLICY *of Aſſurance*.

INTACTÆ, in conics, an appellation ſometimes given to the aſymptotes. See the article ASYMPTOTES.

INTAGLIOS, precious ſtones on which are engraved the heads of great men, inſcriptions, and the like, ſuch as we frequently ſee ſet in rings, ſeals, &c.

INTEGER, in arithmetic, a whole number, in contradiſtinction to a fraction. See NUMBER and FRACTION.

INTEGRAL, or INTEGRANT, in the ſchools, denotes thoſe parts which are neceſſary to the integrity of any whole, and ſo ſtand contradiſtinguiſhed from eſſential parts. The arms, &c. are integral parts of a man; body and ſoul are eſſential parts.

INTEGRAL *Calculus*, in the new analyſis, is the counter part to the differential calculus. The latter hath been fully explained by M. l'Hoſpital; but the former hath been but little cultivated.

The integral calculus of Leibnitz and others anſwers to the inverſe method of fluxions among the Engliſh.

INTENDMENT, in law, is the intention, deſign, or true meaning of a perſon or thing, which frequently ſupplies what is not fully expreſſed: but though the intent of parties in deeds and contracts is much regarded by the law, yet it cannot take place againſt the rules of law.

INTENDMENT *of Crimes*; this in caſe of treaſon, where the intention is proved by circumſtances, is puniſhable in the ſame manner as if it was put in execution.

INTERCALARY DAY, in chronology, the odd day inſerted in a leap-year. See the article BISSEXTILE.

The word is Latin, *intercalaris*, and derived from *inter*, and *calo*, which anciently ſignified to call with a loud voice: an intercalary day among the Romans, ſignifying a day inſerted between two other days, which for that reaſon was proclaimed by the prieſts with a loud voice.

INTERCEPTED AXIS, in conic ſections, the ſame with abſciſs. See ABSCISS.

INTERCOLUMNIATION, in architecture, implies the ſpace between two columns, which is always to be proportioned to the height and bulk of the columns.

INTERCOMMONING, in law, is when the commons of two manors lie together, and the inhabitants of both have, time out of mind, cauſed their cattle to feed promiſcuouſly on them.

INTERCOSTAL, in anatomy, an appellation given to ſuch muſcles, nerves, arteries, and veins, as lie between the ribs. See RIB.

INTERDICT, an eccleſiaſtical cenſure, by which the church of Rome forbids the performance of divine ſervice in a kingdom, province, town, &c.

INTEREST, a ſum of money which is reckoned for the loan and forbearance of ſome other ſum lent for, or due at, a certain time, according to a certain rate in the hundred pounds. The ſum lent or forborn is called the principal, becauſe it produces the intereſt, or from which the intereſt is reckoned. Intereſt is either ſimple or compound.

Simple INTEREST is that which is paid for the loan of any principal or ſum of money lent out for ſome time at any rate, per cent. agreed on between the borrower and the lender; which, according to the laws of England, ought to be but 5 *l.* for the uſe of 100 *l.* for one year, and 10 *l.* for the uſe of 100 *l.* for two years; and ſo on for a greater or leſs ſum, proportionable to the time propoſed.

There are ſeveral ways of computing or anſwering queſtions about ſimple intereſt; as by the ſingle and double rule of three; others make uſe of tables compoſed of ſeveral rates per cent.

But we ſhall ſhew, that all computations relating to ſimple intereſt, are grounded upon arithmetical progreſſion; and from thence raiſe ſuch general theorems as will ſuit with all caſes. In order to that,

Let P = any principal or ſum put to intereſt.
R = the ratio of the rate per cent. per annum.
t = the time of the principal's continuing at intereſt.
A = the amount of the principal and its intereſt.

Note. The ratio of the rate is only the simple intereſt of 1 *l.* for one year, at any given rate; and it is found thus: viz.

100 : 5 : : 1 : 0.05 = the rate at 5 per cent. per annum.

100 : 6 : : 1 : 0.06 = the rate at 6 per cent. &c.

Again, 100 : 6.5 : : 1 : 0.065 = the ratio 6 and ½ per cent.

And if the given time be whole years, then t = the number of thoſe years: but if the time given be either pure parts of a year, or parts of a year mixed with years, thoſe parts muſt be turned into decimals; and then t = thoſe decimals, &c.

Now the common parts of a year may be eaſily turned or converted into decimal parts, if it be conſidered that

one { day is the $\frac{1}{365}$ part of a year = 0.00274,
month is the $\frac{1}{12}$ part of a year = 0.08333,
quarter is the $\frac{1}{4}$ part of a year = 0.25,

half a year = 0.5, and three quarters = 0.75.

Theſe things being premiſed, we may proceed to raiſing the theorems:

Let R = the intereſt of 1 *l.* for one year, as before; then 2 R = the intereſt of 1 *l.* for two years, and 3 R = the intereſt of 1 *l.* for three years, 4 R = the intereſt of 1 *l.* for four years; and ſo on for any number of years propoſed.

Hence it is plain, that the ſimple intereſt of 1 *l.* is a ſeries of terms in arithmetical progreſſion increaſing, whoſe firſt term and common difference is R, and the number of all the terms is t; therefore the laſt term will always be tR = the intereſt of 1 *l.* for any given time ſignified by t.

Then { As 1 *l.* is to the intereſt of 1 *l.* ſo is any principal, or given ſum, to its intereſt.

That is, 1 *l.* : tR : : P : tR P = the intereſt of P. Then the principal being added to its intereſt, their ſum will be = A, the amount required: which gives this general theorem:

Theorem tR P + P = A.

From whence the three following theorems are eaſily deduced:

Theorem 2. $\left\{ \frac{A}{tR+1} = P. \right.$

Theorem 3. $\left\{ \frac{A-P}{tP} = R. \right.$

Theorem 4. $\left\{ \frac{A-P}{RP} = t. \right.$

Theſe four theorems reſolve all queſtions about ſimple intereſt. Thus, if it were to be required to find what 256 *l.* 10 *s.* will amount to in three years, one quarter, two months, and eighteen days, at 6 per cent. per annum.

Here is given P = 256.5, R = 0.06, and t = 3.46599. Quere A, per theorem 1.

For three years = 3.
One quarter = 0.25
Two months = 0.16667 = 0.08333 × 2
Eighteen days = 0.04932 = 0.00274 × 18

Hence t = 3.46599 × 0.06 = 0.2079594 = tR.

Then 0.207594 × 256.5 = 53.341586 = tR P.

And 53.341586 + 256.5 = 309.841586 = tR P + P = A.

That is, 309.841586 = 309 *l.* 16 *s.* 10 *d.* being the anſwer required.

And thus may all queſtions, relating to ſimple intereſt, be reſolved, due regard being had to the theorem relating to the queſtion.

Annuities, or penſions in arrears, may be computed by ſimple intereſt, as follows:

When annuities, payable yearly, half yearly, &c. are not paid as they become due, ſuch annuities are ſaid to be in arrears; and, therefore, to find the value of an annuity in arrears, we muſt calculate what all thoſe payments will amount to, allowing any rate of ſimple intereſt for their forbearance, from the time each particular payment became due. In order to this, put u = the annuity, t = the time it has continued unpaid, R = the ratio, or intereſt for 1 *l.* for one year, and A = the amount of the annuity and its intereſt.

Then if u = the firſt year's rent due with intereſt, R u will = the intereſt, and 2 u = the rent due at the end of the ſecond year; and, conſequently, 2 R u = the intereſt, and 3 u = the rent due at the end of the third year; and 3 R u = the intereſt, and 4 u = the rent due at the end of the fourth year: and ſo on for any number of years.

Hence it is evident, that R u + 2 R u + 3 R u + 4 R u + 5 u = A, the ſum of all their rents and intereſts being forborn five years: from whence it follows, that R u + 2 R u + 3 R u + 4 R u = A − t u. Here t = 5. Divide the equation by u, and we have R + 2 R + 3 R + 4 R = $\frac{A-tu}{u}$. In order to find the ſum of this progreſſion, put z = R + 2 R + 3 R + 4 R, &c. Then 1 + 2 + 3 + 4, &c. = $\frac{z}{R}$. Here the ſum of the firſt and laſt terms is 4 + 1 = 5 = t. And the number of all the terms is 4 = t − 1; therefore $\frac{t-1}{2} \times t$ = the ſum of all the terms. That is, $\frac{tt-t}{2} = \frac{Z}{R}$. Hence $\frac{ttR-tR}{2} = z$. Conſequently $\frac{ttR-tR}{2} = \frac{A-tu}{u}$.

From this equation the three following theorems are eaſily and naturally deduced:

Theorem 1. $\frac{ttRu-tRu+2tu}{2} = A$. Or $\frac{ttu-tu}{2} \times R : + tu = A$.

Theorem 2. $\frac{2A}{ttR+tR+2t} = u$.

Theorem 3. $\frac{2A-2tu}{ttu-tu} = R$. Let $\frac{2}{R} = x + 1$. Then $t = \sqrt{\frac{2A}{Ru} + \frac{xx}{4}} - \frac{1}{2}x$. Theorem 4.

By

By the help of these four theorems, all questions of this nature may be easily solved. Thus, for example:

Suppose 250 *l.* yearly annuity, be forborn or unpaid seven years, what will it amount to in that time at 6 per cent. for each payment as it becomes due?

Here $u = 250$, $t = 7$, and $R = 0{,}06$, are given, to find A; which is easily performed by theorem 1. For, first $250 \times 7 = 1750 = tu$; and $1750 \times 7 = 12250 = ttu$. Again, $12250 - 1750 = 10500 = ttu - tu$. And $\frac{10500}{2} \times 0{,}06 = 315$. Lastly, $315 + 1750 = A = 2065$ *l.* the answer required.

Having shewn the method of finding the value of annuities in arrears, we shall proceed to explain the manner of finding the present worth of annuities, computed at simple interest.

The whole business of purchasing annuities, or taking of leases, &c. for any assigned time, depends upon the purchase, with the annuity or yearly rent, by allowing the same rate of interest to both parties, which may be easily performed by carefully attending to what has been already said. For example, What is 75 *l.* yearly rent, to continue nine years, worth in ready money at 6 per cent. per annum, simple interest?

First, by theorem 1, find what the proposed yearly rent would amount to, if it were forborn nine years at 6 per cent. which by the said theorem will amount to $837 = A$.

Then find what principle, being put out to interest for the same time, and at the same rate, will amount to 837 *l.* $= A$.

Thus $tR = 0.54 = 9 \times 0.06$, $tR + 1 = 1.54$, by which divide 837, and we have $543.5064 =$ 543 *l.* 10 *s.* $1\frac{1}{2}$ *d.* the present worth of the annuity required.

Compound INTEREST, is that which arises from any principal and its interest put together, as the interest still becomes due; so that at every payment, or at the time when the payments become due, there is created a new principal; and for that reason it is called interest upon interest, or compound interest.

As for instance, suppose 100 *l.* were lent out for two years, at 6 per cent. per annum, compound interest; then at the end of the first year, it will only amount to 106 *l.* as in simple interest; but for the second year this 106 *l.* becomes principal, which will amount to 112 *l.* 7 *s.* $2\frac{1}{2}$ *d.* at the second year's end; whereas by simple interest it would have amounted to but 112 *l.* And although it be not lawful to let out money at compound interest, yet in purchasing annuities or pensions, &c. and taking leases in reversion, it is very usual to allow compound interest to the purchaser for his ready money, and therefore it is very requisite to understand it.

Let R be the amount of one pound in one year, viz. principal and interest; P any sum put out at interest for any number n of years, a its amount, A any annuity forborn n years, m its amount, and v its worth in present money, for the same time.

Therefore, since one pound put out at interest, in the first year is increased to R, it will be as 1 to R, so is R, the sum forborn the second year, to R^2, the amount of one pound in two years; and therefore, as 1 to R, so is R^2, the sum forborn the third year, to R^3, the amount in three years; whence it appears, that R^n, or R, raised to the power whose exponent is the number of years, will be the amount of one pound in those years; but as 1 *l.* to its amount R^n, so is P to a, its amount in the same time; whence we have $P \times R^n = a$. And because the amount of one pound in n years is R^n, its increase in that time will be $R^n - 1$; but its interest for one single year, or the annuity answering to that increase, is $R - 1$; therefore, as $R - 1$ to $R^n - 1$, so is A to m. Hence we get $\frac{A \times R^n - 1}{R - 1} = m$. But as it appears that one pound, ready money, is equivalent to R^n, to be received at the expiration of n years, we have, as R^n to 1, so is $\frac{A \times R^n - 1}{R - 1}$ (the sum in arrear) to v, its present worth in ready money; whence $\frac{A \times 1 - R^{\frac{1}{n}}}{R - 1} = v$. From these theorems, the various questions relating to compound interest, annuities in arrears, and purchasing of annuities, are respectively resolved.

Several ingenious mathematicians, as Dr. Halley, De Moivre, Simpson, &c. have explained the method of computing the expectation or estimate of life; we shall therefore here subjoin, a curious and useful table, that shews the value of annuities for every fifth year of age to the 75th, at 3, 4, and 5 per cent. as given by the last mentioned gentleman, in his Doctrine of Annuities upon Lives.

Age	Year's purchase at 5 per cent.	Year's purchase at 4 per cent.	Year's purchase at 3 per cent.
6	14.1	16.2	18.8
10	14.3	16.4	19.0
15	13 9	15.8	18.3
20	13.0	14.8	17.2
25	12.3	14.0	16.1
30	11.6	13.1	15.0
35	10.9	12.3	14.1
40	10.3	11.5	13.2
45	9 8	10.8	12.3
50	9.2	10.1	11.4
55	8.5	9.3	10.3
60	7.9	8.4	9.2
65	7.1	7.5	8.0
70	6.2	6.5	6.9
75	5.2	5.4	5.6

INTEREST, in law, is generally taken for a chattel real, or a leaſe for years, &c. but more for a future term.

INTERJECTION, in grammar, an indeclinable part of ſpeech, ſignifying ſome paſſion or emotion of the mind.

As the greateſt part of the expreſſions uſed on theſe occaſions are taken from nature alone, the real interjections in moſt languages, are monoſyllables; and as all nations agree in theſe natural paſſions, ſo do they agree in the ſigns and indications of them, as of love, mirth, &c.

The Greeks confound their interjections with adverbs, and the Hebrews confound them with their adverbs and prepoſitions, calling them all by the general name particle.

INTERIM, a name given to a formulary, or kind of confeſſion to the articles of faith, obtruded upon the proteſtants after Luther's death by the emperor Charles V. when he had defeated their forces; ſo called becauſe it was only to take place in the interim, mean time, till a general council ſhould have decided all points in diſpute between the proteſtants and the Romaniſts.

INTERLOCUTORY ORDER, in law, an order that does not decide the cauſe, but only ſome matter incident thereto, which happens between the beginning and end of a cauſe; as when in chancery or exchequer, the plaintiff obtains an order for an injunction until the hearing of the cauſe; which order, not being final, is called interlocutory.

INTERLUDE, an entertainment exhibited on the theatre between the acts of the play, to amuſe the ſpectators while the actors ſhift their dreſs, or to give time of changing the ſcenes and decorations.

INTERMITTENT, or INTERMITTING FEVERS, ſuch fevers as go off and ſoon return again, in oppoſition to thoſe which are continual. See the article *Intermitting* FEVER.

INTERNAL, in general, denotes whatever is within a thing.

INTERNODIUM, among botaniſts, implies the ſpace between two knots or joints of the ſtalks of barley, oats, and the like plants.

INTEROSSEUS, in anatomy, an appellation given to the muſcles which move the fingers and toes, from their being ſituated between the bones of thoſe parts. See the articles MUSCLE, FLEXOR, &c.

INTERPRETATION, among critics, denotes a ſpurious paſſage, inſerted into the writings of ſome ancient author.

INTERPRETER, in general, denotes a perſon who explains the words or writings of another, ſo as to make them intelligible to thoſe who did not underſtand them before.

INTERREGNUM, the time during which the throne is vacant, in elective kingdoms; for in ſuch as are hereditary, like ours, there is no ſuch thing as an interregnum.

INTERREX, the magiſtrate who governs during an interregnum.

INTERROGATION, or *Point of* INTERROGATION, in grammar, a character of this form (?) ſerving to denote a queſtion.

INTERROGATION, in rhetoric, is a figure, whereby the orator propoſes ſomething by way of queſtion; which, it muſt be owned, greatly enlivens the diſcourſe.

INTERROGATORIES, in law, are queſtions wrote down, and demanded of the witneſſes examined in a cauſe, more eſpecially in the court of chancery.

INTERRUPTION denotes the ſame thing with disjunction in proportion, and is noted thus (::) ſignifying the breaking of the ratio in the middle of four diſcrete proportionals, as A : B :: C : D; that is, as A to B, ſo is C to D.

INTERRUPTION, in rhetoric, when a perſon breaks off his diſcourſe ſuddenly to ſhew ſome paſſion.

INTERSECTION, in mathematics, the cutting of a line or plane by another, or the point or line wherein two lines, or two planes, cut each other.

The word is derived from the Latin *inter*, and *ſeco*, to cut.

The mutual interſection of two planes in a right line. The center of a circle is in the interſection of two diameters, &c. The equinoxes happen, when the ſun is in the interſections of the equator and ecliptic.

INTERSPINALES *Colli*, in anatomy, ſmall fleſhy muſcles of the neck, ariſing from the ſuperior parts of each double ſpinal proceſs of the neck, except of the ſecond vertebra; and inſerted into the inferior parts of all the double ſpines. When theſe muſcles act, they draw the ſpines of the vertebra of the neck nearer each other.

INTERSTELLAR, a word uſed by ſome authors to expreſs thoſe parts of the univerſe that are without and beyond our ſolar ſyſtem.

INTERTIES, in architecture, thoſe ſmall pieces of timber that lie horizontally between the ſommers, or between them and the ſell, or reſon.

INTERTRANSVERSALES *Colli*, in anatomy, certain muſcles ſituated among the tranſverſe apophyſes of the vertebræ: they ariſe from the lower vertebra, and are inſerted into that next above: they are of the ſame ſize and figure with the interſpinales.

INTERVAL, in muſic, the difference between two ſounds, in reſpect of acute and grave; or, that imaginary ſpace terminated by two ſounds, differing in acuteneſs or gravity.

INTERVALS, in gardening and huſbandry, the ſpaces left between the ſeveral rows of plants ſown or ſet in gardens or fields. See HUSBANDRY.

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INTESTATE, in law, a perſon that dies without making a will; in which caſe, a diſtribution of his perſonal eſtate, after his debts and funeral charges are paid, is to be made among the wife and children of the deceaſed, or for want of ſuch, among the next of kin.

INTESTINES, in anatomy, long, cylindrical, hollow, and membranaceous bodies; or rather, one ſuch continued body, or tube, reaching from the ſtomach to the anus.

The ſtructure and ſubſtance of the inteſtines are membranaceous; being formed, in every part, of five coats or tunics. The firſt is the common coat, from the peritonæum, and is membranaceous. The ſecond is cellular, and is called by late writers, tunica celluloſa Ruyſchii: it is contiguous with the meſentery, and is to be diſcovered by inflating it; this coat, in fat animals, frequently contains abundance of fat. The third is muſcular; it is compoſed of a double ſeries of fibres, in part longitudinal, and in part annular; and theſe aſſiſt the motion of the guts. The fourth coat is nervous: it is furniſhed with abundance of cellules, vaſcules, and glands, and is thicker than the others: from this ariſe the rugæ, and the valves of the inteſtines. The fifth is the villoſe coat, which ſuſtains the terminations of the excretory veſſels, and the beginnings of the lacteals: hence, when nicely examined, it has the appearance of a ſieve: it is the organ of percolation of the chyle.

The inteſtines have veſſels in great abundance. Their arteries are from the meſeraic ones: the upper meſeraic ſerving for the ſmaller inteſtines, the lower for the larger; and theſe make a multitude of very ſingular and ſurprizing anaſtomoſes. The veins are meſeraics, and go off to the vena portæ and the liver. The nerves are ſent from the intercoſtals, and the par vagum. And beſides theſe we are to obſerve the lacteal veſſels. See the article LACTEAL.

The rectum, it is to be obſerved, receives blood-veſſels alſo from the hypogaſtrics. There are alſo, beſides the Brunnerian glands of the duodenum, other glands in the inteſtines, called from the name of the perſon who diſcovered them, glandulæ Peyeri. Theſe, in the ſmall guts, are uſually little, congregate, and miliary; but ſometimes they are ſingle. They are larger as they are nearer to the duodenum, and ſmaller as they approach towards the great guts. Their office is to diſcharge into the inteſtines a liquor, which ſerves for the attenuation of the chyle, and for the lubricating of the inteſtines. In the larger guts, and in the vermiform appendage, they are ſingle and large, of a lenticular figure; and they are largeſt of all in the rectum. They have mouths, out of which there is ſecreted a fluid, which ſerves to lubricate the ſides of the inteſtines, and to ſoften the fæces, that they may be evacuated without pain.

The uſe of the ſmaller guts is to promote the formation of the chyle, to perfect its ſecretions, and to propel the remaining fæces to the larger. The office of the larger guts is to receive and collect the matter of the fæces, at a proper time to expel it. See CHYLE.

INTESTINAL, ſomething belonging to, or ſeated in the inteſtines.

INTRADA, ENTRY, in the Italian muſic, is much the ſame with prelude or overture.

INTRENCHMENT, or RETRENCHMENT, in the art of war. See the article RETRENCHMENT.

INTRIGUE, or INTREAGUE, an aſſemblage of events or circumſtances, occurring in an affair, and perplexing the perſons concerned in it.

In this ſenſe, it uſed to ſignify the nodus or plot of a play or romance; or that point wherein the principal characters are moſt embarraſſed, through the artifice and oppoſition of certain perſons, or the unfortunate falling out of certain accidents and circumſtances.

In tragedy, or an epic poem, there are always two deſigns; the firſt and principal is that of the hero of the piece. The ſecond contains the deſigns of all thoſe who oppoſe him: theſe oppoſite cauſes produce oppoſite effects; to wit, the efforts of the hero for the execution of his deſign, and the efforts of thoſe who thwart it. As thoſe cauſes and deſigns are the beginning of the action, ſo theſe efforts are the middle, and there form a knot or difficulty which we call the intrigue, that makes the greateſt part of the poem. It laſts as long as the mind of the reader or hearer is ſuſpended about the event of thoſe oppoſite efforts: the ſolution or cataſtrophe commences when the knot begins to unravel, and the difficulties and doubts begin to clear up.

INTRINSIC, a term applied to the inner, real, and genuine values, properties, &c. of any thing, in oppoſition to their extrinſic or apparent values, &c.

INTRUSION, in law, obtains where an anceſtor dies ſeiſed of an eſtate or inheritance, which is expectant upon an eſtate for life, and the tenant for life dies; after which a ſtranger enters before the heir, in which caſe he is ſaid to intrude.

INTUITION, among logicians, the act whereby the mind perceives the agreement or diſagreement of two ideas, immediately by themſelves, without the intervention of any other; in which caſe, the mind perceives the truth as the eye doth the light, only by being directed towards it. Thus the mind perceives that white is not black, that three are more than two, and equal to one and two. See IDEA.

This part of knowledge, ſays Mr. Locke, is irreſiſtible, and, like the ſun-ſhine, forces itſelf immediately to be perceived as ſoon as ever the mind turns its view that way. It is on this intuition that

all the certainty and evidence of our other knowledge depends; this certainty every one finds to be so great, that he cannot imagine, and therefore cannot require, a greater. See the articles JUDGMENT, KNOWLEDGE, DEMONSTRATION, &c.

INVALID, a person wounded, maimed, or disabled for action by age, &c.

INVECTED, in heraldry, denotes a thing fluted or furrowed.

INVECTIVE, in rhetoric, differs from reproof, as the latter proceeds from a friend, and is intended for the good of the person reproved; whereas the invective is the work of an enemy, and entirely designed to vex and give uneasiness to the person against whom it was directed.

INVENTION denotes the act of finding any thing new, or even the thing thus found.

INVENTION, in rhetoric, being one of the second divisions of invention, according to Bacon, signifies the finding out and choosing of arguments which the orator is to use for proving his point, or moving his hearers passions.

INVENTION, in poetry, is applied to whatever the poet adds to the history of the subject he has chosen, as well as to the new turn he gives it.

INVENTION, in painting, is the choice which the painter makes of the objects that are to enter the composition of his piece.

INVENTORY, in law, &c. is a schedule containing all the goods and chattels of a deceased person that belonged to him at the time of his death, together with the value of the same, as appraised by two or more indifferent persons.

INVERSE is applied to a manner of working the rule of three, or proportion, which seems to go backward, or contrary to the order of the common or direct rule. See the articles RULE *of Three* and PROPORTION.

INVERSION, in grammar, is where the words of a phrase are ranged in a manner not so natural as they might be.

It is a considerable beauty either in verse or prose, when we have it from an able hand; it gives vigour and variety to a sentence, and keeps the mind in an agreeable suspence and expectation of a marvellous turn and conclusion.

INVESTIGATION properly denotes the finding any thing out by the prints of the feet.

Mathematicians, &c. have hence applied the word to the respective researches in which they are employed.

INVESTIGATION *of a Theme*, in grammar, the finding out the primitive sense, mood, and person of any verb that is remote from its source.

It is absolutely necessary to be acquainted with this method of investigation, in order to understand a Greek author.

Clenard was the first who introduced the term into grammar.

INVESTITURE, in law, a giving livery of seisin or possession.

INULA, in botany, a genus of plants whose flower is compounded and radiated; the corollæ which compose the disc are very numerous, hermaphrodite, and infundibuliform; the female flowers form the rays, and are ligulated and linear; there is no pericarpium, but the cup, which is immutable, contains solitary, quadrangular, linear seeds, placed on a plane naked receptacle.

To this genus belongs the elecampane. See the article ELECAMPANE.

INVOCATION, in theology, the act of adoring God, and especially of addressing him in prayer for his assistance and protection.

INVOCATION, in poetry, an address at the beginning of a poem, wherein the poet calls for assistance of some divinity, particularly of his muse, or the deity of poetry.

INVOICE, an account in writing of the particulars of merchandize, with their value, custom, charges, &c. transmitted by one merchant to another in a distant country.

One copy of every invoice is to be inserted verbatim in the invoice-book, for the merchant's private use; and another copy must, immediately upon shipping off the goods, be dispatched by post, or otherwise, to the correspondent. This copy is commonly drawn out upon a sheet of large post-paper, to the end of which is subjoined a letter of advice.

INVOICE-BOOK. This book is paged, and contains copies of the invoices of goods sent to sea: for as a merchant is obliged to send his correspondent an invoice of all the goods he consigns to him, so it is reasonable that he should keep a copy of it for himself.

INVOLUCRUM, among botanists, a kind of calyx placed at the foot of an umbel at a distance from the flower, by the length of the footstalk surrounding a number of flowers, each of which having, besides this general cup, its own particular perianthium. An involucrum is either universal or partial, and is generally disposed in a radiated form.

INVOLUTION, in algebra, the raising any quantity from its root to any height or power assigned.

The quantity a^m expresses any power of a in general; the exponent (m) being undetermined; and a^{-m} expresses $a^{\frac{1}{m}}$, or a negative power of a of an equal exponent: and $a^m \times a^{-m} = a^{m-m} = a^0 = 1$ is their product, a^n expresses any other power of a; $a^m \times a^n = a^{m \times n}$ is the product of the powers a^m and a^n, and a^{m-n} is their quotient.

To raise any simple quantity to its 2d, 3d, or 4th power, is to add its exponent twice or four times to itself; therefore, the 2d power of any quantity is had by doubling its exponent, and the third

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by trebling its exponent; and in general, the power expreſſed by m of any quantity is had by multiplying the exponent by m, as is obvious from the multiplication of powers.

Thus, the 2d power or ſquare of a is $a^{2\times1}=a^2$; its third power or cube is $a^{3\times1}=a^3$; and the mth power of a is $a^{m\times1}=a^m$. Alſo the ſquare of a^4 is $a^{2\times4}=a^8$; the cube of a^4 is $a^{3\times4}=a^{12}$; and the mth power of a^4 is $a^{4\times m}$. The ſquare of abc is $a^2b^2c^2$, the cube is $a^3b^3c^3$, the mth power $a^mb^mc^m$.

The co-efficient muſt alſo be raiſed to the ſame power by a continual multiplication of itſelf, as often as an unit by itſelf, is contained in the exponent of the power required. Thus the cube of $3ab$ is $3\times3\times3\times a^3b^3=27a^3b^3$.

As to the ſigns when the quantity to be involved is poſitive, it is obvious that all its powers muſt be poſitive. And, when the quantity to be involved is negative, yet all its powers whoſe exponents are even numbers muſt be poſitive; for any number of multiplications of a negative, if the number is even, gives a poſitive.

The power then only can be negative, when its exponent is an odd number, though the quantity to be involved be negative.

The powers of $-a$ are $-a$, $+a^2$, $-a^3$, $+a^4$, $-a^5$, &c.

Thoſe whoſe exponents are 2, 4, 6, &c. are poſitive; but thoſe whoſe exponents are 1, 3, 5, &c. are negative.

The involution of compound quantities is a more difficult operation. The powers of any binomial $a+b$ are found by a continual multiplication of it by itſelf, as follows:

$a+b=$ the root.

$\times\ a+b$

a^2+ab

$\quad+ab+b^2$

$a^2+2ab+b^2=$ the ſquare, or 2d power.

$\times\ a+b$

$a^3+2a^2b+ab^2$

$\quad+a^2b+2ab^2+b^3$

$a^3+3a^2b+3ab^2+b^3$

$\times\ a+b$

$a^4+3a^3b+3a^2b^2+ab^3$

$\quad+a^3b+3a^2b^2+3ab^3+b^4$

$a^4+4a^3b+6a^2b^2+4ab^3+b^4=$ the biquadrate or 4th power.

If the powers of $a-b$ are required, they will be found the ſame as the preceding, only the terms in which the exponent of b is an odd number will be found negative; becauſe an odd number of multiplications of a negative produces a negative. Thus the cube of $a-b$ will be found to be $a^3-3a^2b+3ab^2-b^3$; where the 2d and 4th terms are negative, the exponent of b being an odd number in theſe terms. In general, the terms of any power of $a-b$ are poſitive and negative by turns.

If it be obſerved, that, in the firſt term of any power of $a\mp b$, the quantity a has the exponent of the power required; that, in the following terms, the exponents of a decreaſe gradually by the ſame difference (viz. an unit) and that in the laſt terms it is never found: the powers of b are in the contrary order; it is not found in the firſt term, but its exponent in the 2d term is an unit, in the 3d term its exponent is 2; and thus its exponent increaſes, till in the laſt term, it becomes equal to the exponent of the power required.

As the exponents of a thus decreaſe, and at the ſame time thoſe of b increaſe, the ſum of their exponents is always the ſame, and is equal to the exponent of the power required.

To find the co-efficient of any term, the co-efficient of the preceding term being known, you are to divide the co-efficient of the preceding term by the exponent of b in the given term, and to multiply the quotient by the exponent of a in the ſame term, increaſed by an unit.

In general, if $a+b$ is to be raiſed to any power m, the terms, without their co-efficients, will be a^m, $a^{m-1}b$, $a^{m-2}b^2$, $a^{-3}b^3$, a^{m-4}, b^4, $a^{m-5}b^5$, &c. continued till the exponent of b becomes equal to m.

The co-efficients of the reſpective terms, according to the laſt rules, will be 1, m, $m\times\frac{m-1}{2}$, $m\times\frac{m-1}{2}\times\frac{m-2}{3}$ $m\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{4}$, $m\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{4}\times\frac{m-4}{5}$, &c. continued until you have one co-efficient more than there are units in m.

JOACHIMITES, in church hiſtory, the diſciples of Joachim, a Ciſtercian monk, who was an abbot of Flora in Calabria, and a great pretender to inſpiration.

JOB, or *Book of* Job, a canonical book of the Old Teſtament, containing a narrative of a ſeries of misfortunes which happened to a man whoſe name was Job, as a trial of his virtue and patience; together with the conferences he had with his cruel friends, on the ſubject of his misfortunes, and the manner in which he was reſtored to eaſe and happineſs. This book is filled with thoſe noble, bold and figurative expreſſions, which conſtitute the very ſoul of poetry.

Many of the Jewiſh rabbins pretend that this relation is altogether a fiction: others think it a ſimple narrative of a matter of fact, juſt as it happened; while a third ſort of critics acknowledge that the ground-work of the ſtory is true, but that it is wrote in a poetical ſtrain, and decorated with peculiar circumſtances, to render the narration more profitable and entertaining.

The time is not ſet down in which Job lived. Some have thought that he was much ancienter than

Moſes, becauſe the law is never cited by Job or his friends, and becauſe it is related that Job himſelf offered ſacrifices. Some imagine that this book was wrote by himſelf; others ſay, that Job wrote it originally in Syriac or Arabic, and that Moſes tranſlated it into Hebrew: but the rabbins generally pronounce Moſes to be the author of it, and many Chriſtian writers are of the ſame opinion.

JOBBER, in law, a perſon that buys and ſells cattle for others. Hence ſtock-jobbers are perſons who buy and ſell ſtocks for other perſons.

IOGUIS, among the Eaſt-Indians, a kind of hermits, who generally ſtand under trees, or near their pagods. Some of them go ſtark naked, holding their arms acroſs over their heads, and continue in that poſture all their lives: others lie on the ground, with one leg higher than the other, and and their arms raiſed above their head; and theſe wretched penitents inſenſibly loſe the uſe of their arms and legs: ſome confine themſelves in cages, ſet on the top of a thick ſtake, fixed in the ground, and theſe cages are ſo ſmall, that they put the penitent to prodigious torture: ſome holding a ſabre in one hand, and a kind of ſhield in the other, go up a kind of crane, where hooking themſelves to an iron, which runs a conſiderable way into their backs, they ſpring forward into the air, flouriſhing their ſabres, and launching out into extravagant praiſes of their idols, and others plunge into the Ganges, in hopes of being devoured by a crocodile, fancying that by this means they ſhall obtain the happineſs of the next life.

Theſe miſerable wretches are conſidered by the Indians, as perfect models of piety and holineſs: they are followed by perſons of both ſexes, who make a vow of devoting themſelves to their ſervice, and are wholly employed in ſoothing their voluntary ſufferings by offering them alms and refreſhments. They call the pious to their devotions by ringing a little bell; and when they hold their ſpiritual converſations, they ſit cloſe in a ring, and ſet up a banner made of ſeveral pieces of ſtuff faſtened at the end of a ſtick.

JOHN, or *Goſpel of St.* JOHN, a canonical book of the New Teſtament, containing a recital of the life, actions, doctrine and death of our Saviour Jeſus Chriſt, written by St. John the apoſtle and evangeliſt. See the article GOSPEL.

St. John wrote his goſpel at Epheſus, after his return from the Iſle of Patmos, at the deſire of the chriſtians of Aſia. St. Jerom ſays, he would not undertake it, but on condition they ſhould appoint a public faſt, to implore the aſſiſtance of God, and that faſt being ended, St. John, filled with the Holy Ghoſt, broke out into theſe words. "In the beginning was the word," &c. The ancients aſſign two reaſons for this undertaking: the firſt is, becauſe in the other three goſpels, there was wanting the hiſtory of the beginning of Jeſus Chriſt's preaching, till the impriſonment of John the Baptiſt, which, therefore, he applied himſelf particularly to relate. The ſecond reaſon was in order to remove the errors of the Corinthians, Ebionites, and other ſects.

St. JOHN's Day, the name of two Chriſtian feſtivals, one obſerved on the 24th of June, kept in commemoration of the wonderful circumſtances attending the birth of St. John the Baptiſt; and the other on the 27th of December, in honour of St. John the Evangeliſt.

St. JOHN's WORT, a plant called by authors hypericum. See HYPERICUM.

JOINDER, or JOYNDER, in law, ſignifies the joining of two perſons in one ſuit againſt another; as for inſtance, if there are two joint-poſſeſſors of goods, and theſe are taken from one of them, they may both join in an action to recover them.

JOINERY, the art of working in wood, or of fitting various pieces of timber together.

JOINT, in general, denotes the juncture of two or more things.

The joints of the human body are called by anatomiſts articulations. See ARTICULATION.

The term joint is alſo applied to the ſeparation between the ſtones or bricks of a building, uſually filled with mortar, plaſter, or cement; alſo by carpenters, to the ſeveral manners of aſſembling or fitting pieces of wood together, as a dove-tail joint, &c.

Stiffneſs of the JOINTS, in ſurgery and medicine, ſometimes proceeds from the bones being broken, bruiſed, or wounded, eſpecially about the extreme parts, which being kept in one poſture, in order for cure, the ſynovia of the joints becomes thick, and depraves or quite aboliſhes its motion; or it may proceed from the bony juice proceeding from broken bones, and inſinuating itſelf into the joint. Hoffman ſays, diſeaſes of the joints ſometimes proceed from ſpaſms of the ligament.

JOINT-EXECUTORS, in law, are when two or more perſons are appointed ſuch by will; in which caſe they are accounted but as one ſingle perſon; ſo that the actions done by one of them are taken to be the acts of all, becauſe they all repreſent the perſon of the teſtator.

JOINT LIVES, in law, is where any thing is granted or given to two or more during their lives.

JOINT-TENANTS are ſuch as hold lands or tenements jointly by one title; as were a man grants lands, &c. to perſons and their heirs; ſuch perſons, during their joint tenancy muſt jointly plead as well as be jointly ſued, which is common to them with coparceners of lands.

JOINTURE, in law, generally implies a ſettlement of lands and tenements made on a woman in conſideration of marriage.

It alſo ſignifies a covenant, by which the huſband, or ſome friends of his, aſſures lands, &c. to his wife, for the term of her life.

alſo in Spain, but it does not appear that any labdanum is brought from thence.

Two ſorts of this reſin are met with in the ſhops. The beſt, though very rare, is in dark-coloured black maſſes, of the conſiſtence of a ſoft plaſter, growing ſtill ſofter on being handled: the other is in long rolls coiled up, much harder than the preceding, and not ſo dark. The firſt has commonly a ſmall, and the laſt a very large admixture of fine ſand, which in the labdanum examined by the French academy, amounted to three fourths of the maſs. It is ſcarcely indeed to be collected pure, independently of deſigned abuſes; the duſt blown on the plant by winds from the looſe ſands among which it grows, being retained by the tenacious juice.

Labdanum has been ſometimes exhibited as a reſinous corroborant and reſtringent, but principally employed in external application and perfumes: the ſoft kind makes an uſeful ingredient in the cephalic and ſtomachic plaſters of the ſhops. This ſort has a very agreeable ſmell, and a lightly pungent bitteriſh taſte: the hard is much weaker; and the common means of purifying theſe kinds of ſubſtances, though they ſeparate the ſandy matter mixed with it, render it weaker ſtill.

LABEL, in heraldry, a fillet uſually placed in the middle along the chief of the coat, without touching its extremities. Its breadth ought to be a ninth part of the chief. It is adorned with pendants; and when there are above three of theſe, the number muſt be ſpecified in blazoning.

This is a kind of addition to the arms of a ſecond brother, to diſtinguiſh him from the firſt, and is eſteemed the moſt honourable of all differences.

LABEL, in law, a narrow ſlip of parchment hanging from a deed, writ, or other writing, in order to hold the appending ſeal.

LABEL *of a Circumferentor*, a long thin braſs-ruler, with a ſight at one end, and a center-hole at the other; chiefly uſed with a tangent line, to take altitudes.

LABIA, the lips, in anatomy. See the article LIPS.

LABIAL LETTERS, thoſe pronounced chiefly by means of the lips. See LETTER.

LABIATED FLOWERS, monopetalous flowers, conſiſting of a narrow tube, with a wide mouth, divided into two or more lips. See BOTANY and FLOWERS.

LABORATORY, or ELABORATORY. See ELABORATORY.

LABOUR, in general, denotes a cloſe application to work or buſineſs. Among ſeamen, a ſhip is ſaid to be in labour when ſhe rolls and tumbles very much, either a-hull, under ſail, or at anchor. It is alſo ſpoke of a woman in travel, or child-birth. See DELIVERY.

LABOURING, in the marine, a violent rolling or pitching, ſo as to endanger the maſts and hull, by carrying away or ſpringing the former, and ſtraining the latter, ſo as to occaſion a leak or other diſaſter.

LABYRINTH, in anatomy, the internal cavity of the ear, ſo called from its ſinuoſities and windings. See the article EAR.

LABYRINTH, in gardening, a winding, mazy, and intricate turning to and fro, through a wilderneſs, or a wood.

LAC, MILK, among phyſicians, &c. See the article MILK.

LACCA, LAC, or STICK-LAC, improperly called gum-lac, in natural hiſtory, a concrete brittle ſubſtance, of a dark red colour; brought from the Eaſt-Indies incruſted on pieces of ſticks; internally divided into ſeveral cells; ſaid to be the reſinous juice of certain trees, collected by winged red inſects of the ant kind, impregnated with the tinging matter of the inſects, and by them depoſited either on the branches of the trees, or on ſticks faſtened in the earth for that purpoſe. In the cells are often obſerved ſmall red bodies, which appear to be the young inſects.

The tinging red animal matter of the ſtic-lac diſſolves both in water and rectified ſpirit, and appears to be of the ſame general nature with that of cochineal; like which it is made dull by alkalies, and brighter by acids, and turned to a ſcarlet by a ſolution of tin.

Seed LAC.—If the lac be broken in ſmall pieces, or grains, and infuſed in warm liquor, the remainder will appear of a tranſparent yellowiſh or brownish colour, and, on raiſing the heat ſo as to make the water boil, melts and riſes to the ſurface, and is thence called ſhell-lac.

Artificial LACCA, or LAKE, in painting, a white earthy body, as cuttle-fiſh bone, the baſis of alum, or chalk, tinged with ſome crimſon vegetable dye, ſuch as is obtained from cochineal or Braſil-wood, diſſolved or taken up by means of ſome alkaline ſalt, and precipitated on the earth by the addition of ſome acid.

Lake is uſed in all kinds of painting, except enamel; but particularly in oil, where it ſupplies the place of carmine. It is valuable both for its brightneſs and crimſon teint; which make it uſeful for carnations to the portrait painters; for ſkies to the landſcape or ſhip painters; and for flowers to thoſe who paint ſtill life. Its tranſparency in oil renders it alſo of great ſervice in glazing, as it is called, over vermilion; and in painting ſcarlet draperies, and the red parts of the lips; and its acquiring a dark hue, by this tranſparency, when uſed without the addition of any opake pigment, which gives it an unrivalled excellence in the ſhades of red draperies, or other ſimilar caſes. Notwithſtanding theſe qualities, lake is not at preſent univerſally approved; nor without reaſon; for there is a defect which makes it to be frequently rejected, where its uſe can

be avoided. This defect is the uncertainty of its ſtanding, when prepared in that manner which moſt conduces to its perfection in other reſpects: for though ſome parcels will hold their colour entirely well, yet others prepared in the ſame manner, as far as art can aſſure it, will fly in a degree that makes the uſe of it deſtructive to any painting: and if this defect be effectually remedied, as it may be by ſecuring the tinging particles by gums, from all attacks of the air; yet this is generally at the expence of the brightneſs and tranſparency; the earth, which is the baſis of the pigment, being locked up by the gums, and rendered incapable of being combined intimately with, or imbibing the oil. Beſides the perfections of lake, which it may have in common with other colours, there is yet another that relates only to itſelf, which is the inclining to the ſcarlet hue, that makes it more valuable for almoſt all the purpoſes to which it is applied; and where this quality, joined to the others, happens to be found in it, there is ſcarcely any limits to be ſet on its value with eminent painters of any kind.

Lake was moſt probably firſt made from the colour found in the grains of the ſtick-lac, from whence it ſeems to have taken its name; but it may be made from a great variety of ſubſtances which afford a crimſon tinge; though at preſent it is ſeldom prepared from any other than cochineal, ſcarlet rags, and Braſil-wood.

The beſt of what is commonly ſold is made from the colour extracted from ſcarlet rags, and depoſited on the cuttle-bone, which may be done in the following manner:

"Take a pound of the beſt pearl-aſhes, and having diſſolved them in two quarts of water, purify them by filtering through paper. Add then to this ſolution two more quarts of water; and having put in a pound of ſcarlet ſhreds, procured from the taylors, for they muſt be entirely clean, boil them in a pewter boiler made for that purpoſe, till the ſhreds appear to have wholly loſt their ſcarlet colour. Take them out of the ſolution, and preſs them well; dipping them after in water, and preſſing them again, that all the fluid they had imbibed may be got from them, which muſt be put back to the reſt. Take then another pound of the ſhreds, and repeat the like treatment of them in the ſame ſolution; as alſo a third and fourth pound. While this is doing, diſſolve a pound and half of cuttle-fiſh in a pound of ſtrong aqua-fortis, in a glaſs receiver, adding more of the bone, if it appear to produce any ebullition in the aqua-fortis; and having ſtrained off this ſolution through flannel, pour it into the other by degrees; obſerving whether it produces any effervеſcence on putting in the laſt quantity; which if it do in any great degree, more of the cuttle-fiſh bone muſt be diſſolved in aqua-fortis; and the ſolution very gradually added, till no ebullition appear to be raiſed by it in the mixture. If this be properly managed, the fluid will ſoon become clear and colourleſs, and the tinging particles extracted from the ſhreds, together with the cuttle-fiſh bone, will ſubſide to the bottom, and form a crimſon ſediment, which is the lake. The water muſt then be poured off; and two gallons of hard ſpring-water muſt be put to the lake, and well ſtirred about to mix them; which, being likewiſe poured off, after the lake has again ſettled to the bottom, muſt be replaced by another two gallons; and the ſame method muſt be repeated four or five times; but if hard water cannot be procured, or the lake appear too purple, half an ounce of allum ſhould be added to each quantity of water before it be uſed. When the lake is thus ſufficiently freed from the ſalts, it muſt have the water drained from it in a filter, covered with a linen cloth, which has been ſo worn as to have no knap or down remaining on its ſurface. After the lake has drawn to a proper dryneſs, it muſt be dropped, on clean boards, by means of ſticks of elder, mountain-aſh, or other hollow wood, cut into the form of pens, and ſuffered to dry; when the drops will appear in the form of little cones or pyramids."

If this lake be of a deeper colour than be deſired, the proportion of ſcarlet ſhreds may be diminiſhed; or if it be wanted yet deeper, they may be increaſed.

This lake, when the proceſs ſucceeds well, will be very bright; and will ſtand equally to any whatever: but it is not ſo tranſparent and fit for glazing as that where earth of alum is the baſis.

Orange LAKE.—This lake is the tinging part of annatto precipitated together with earth of alum. It is of a very bright orange colour, and would work well with either oil or water, but cannot be depended upon, when uſed either of thoſe ways, for ſtanding long. It is, however, a very fine colour for varniſh painting, where the fear of flying is out of queſtion; and is alſo of an admirable good effect for putting under cryſtal for the imitation of the vinegar garnet; for which purpoſe it has been uſed with great ſucceſs.

The manner of preparing this lake is as follows:

"Take of the beſt annatto four ounces, and of pearl-aſhes one pound. Put them together into a gallon of water, and boil them half an hour; and then ſtrain the ſolution through paper.—Make, in the mean time, a ſolution of a pound and a half of alum, in another gallon of water: and mix it gradually with the ſolution of the pearl-aſhes and annatto; obſerving to ceaſe any farther addition when the fluid becomes colourleſs, and no further ebullition enſues on the commixture. Treat the ſediment or precipitated matter, then, in the ſame manner as has been before directed for other kinds of lake; only this need not be formed into drops, but may be dried in ſquare bits or round lozenges.

LACHRYMAL, in anatomy, an appellation given

given to ſeveral parts of the eye, from their ſerving to ſecrete the tears.

The lachrymal gland is ſituated in the orbit above the ſmaller angle, and its excretory ducts under the upper eye-lid: theſe are much more eaſily demonſtrated in the eye of an ox, than in a human one.

The lachrymal caruncle is ſituated in the larger angle, or canthus, ſerving to direct the tears to the two puncta lachrymalia; which are ſituated in the ſame angle, at the extremities of the tarſi or cartilages, and terminate in the lachrymal ſaccus, the naſal canal, and in the noſe itſelf. See the article EYE.

LACHRYMALIS FISTULA, in ſurgery and medicine. See FSSTULA.

LACHRYMATORY, in antiquity, a veſſel wherein were collected the tears of a deceaſed perſon's friends, and preſerved along with the aſhes and urn.

LACONISM, λακωνισμος, in matters of ſtyle, a ſhort, pithy obſervation or ſaying; ſo called from the Lacedæmonians, who were remarkable for the conciſeneſs of their diſcourſe. See STYLE.

LACTEA, or VIA LACTEA, the ſame with galaxy. See GALAXY.

LACTEAL VESSELS, in anatomy, long ſlender tubes for the conveyance of the chyle from the inteſtines to the common reſervatory. See the articles CHYLE.

LACTIFEROUS PLANTS, in botany, ſuch plants as abound with a milky juice, as the lithymalus, ſonchus, and lettuce.

LACUNÆ, in anatomy, certain oſcula or orifices, proceeding from the glandulæ ſubſtratæ in the vagina, and often ſo large as to admit a briſtle. Their uſe is to ſecrete a fluid for lubricating the vagina, and ſtimulating to venery.

LACUNAR, in architecture, an arched roof or ceiling, more eſpecially the planking or flooring above porticos and piazzas.

LADANUM, or LABDANUM, in pharmacy. See the article LABDANUM.

LADY'S BEDSTRAW, a plant called by botaniſts gallium. See GALLIUM.

LADY'S COMB, a plant otherwiſe called ſcandix. See the article SCANDIX.

LADY'S FINGER, a ſpecies of vulneraria. See the article VULNERARIA.

LADY'S MANTLE, the Engliſh name of alchimilla. See ALCHIMILLA.

LADY'S SMOCK, the Engliſh name of cardamine. See CARDAMINE.

LADY'S SLIPPER, the Engliſh name of the cypripedium. See CYPRIPEDIUM.

LADY'S TRACES, a name by which ſome call orchis. See ORCHIS.

LADY-DAY, in law, the 25th of March, being the annunciation of the holy virgin. See the article ANNUNCIATION.

LAGOECIA, round-headed cummin, in botany, a genus of plants, the flower of which conſiſts of five petals, very ſhort, and bicornate: there is no pericarpium, the ſeed, which is ſingle, being contained in the cup.

This plant has neither the ſmell, appearance, or taſte of cummin; its ſmell being more like that of the carrot.

LAGOPHTHALMIA, in ſurgery, an everſion and gaping of the eye-lids, otherwiſe called ectropium. See the article ECTROPIUM.

LAIR, among ſportſmen, the place where the deer harbour by day. This term is alſo uſed to ſignify a place where cattle uſually reſt under ſome ſhelter: by which means the ground generally becomes enriched with their dung.

LAKE, a collection of waters contained in ſome cavity in an inland place, of a large extent, ſurrounded with land, and having no communication with the ocean.

Lakes may be divided into four kinds. 1. Such as neither receive nor ſend forth rivers. 2. Such as emit rivers, without receiving any. 3. Such as receive rivers, with emitting any. And, 4. Such as both receive and ſend forth rivers.

Of the firſt kind, ſome are temporary, and others perennial: moſt of thoſe that are temporary owe their origin to the rain, and the cavity or depreſſion of the place in which they are lodged: thus in India there are ſeveral ſuch lakes made by the induſtry of the natives, of which ſome are a mile, and ſome two in circuit; theſe are ſurrounded with a ſtone wall, and being filled in the rainy months, ſupply the inhabitants in dry ſeaſons, who live at a great diſtance from ſprings or rivers. There are alſo ſeveral of this kind formed by the inundations of the Nile and the Niger; and in Muſcovy, Finland, and Lapland, there are many lakes formed, partly by the rains and partly by the melting of the ice and ſnow; but moſt of the perennial lakes, which neither receive nor emit rivers, probably owe their riſe to ſprings at the bottom, by which they are conſtantly ſupplied.

The ſecond kind of lakes, which emit, without receiving rivers, is very numerous. Many rivers flow from theſe as out of ciſterns; where their ſprings being ſituated low within a hollow place, firſt fill the cavity, and make it a lake, which not being capacious enough to hold all the water, it overflows and forms a river: of this kind is the Wolga, at the head of the river Wolga; the lake Odium, at the head of the Tanais; the Adac, from whence one branch of the river Tigris flows; the Ozero, or White Lake, in Muſcovy, is the ſource of the river Shackſna. The great lake Chaamay, which emits four very large rivers, which water the coun-

countries of Siam, Pegu, &c. the Menau, the Aſa, the Caipoumo, and the Laquia, &c.

The third ſpecies of lakes, which receive rivers, but emit none, apparently owe their origin to thoſe rivers, which in their progreſs from their ſource, falling into ſome extenſive cavity, are collected together; and form a lake of ſuch dimenſions, as may loſe as much by exhalation, as it continually receives from theſe ſources: of this kind is that great lake improperly called the Caſpian ſea; the lake Aſphaltites, alſo called the Dead ſea; the lake of Geneva, and ſeveral others.

Of the fourth ſpecies, which both receive and emit rivers, we reckon three kinds, as the quantity they emit is greater, equal, or leſs than they receive. If it be greater, it is plain that they muſt be ſupplied by ſprings at the bottom; if leſs, the ſurplus of the water is probably ſpent in exhalations; and if it be equal, their ſprings juſt ſupply what is evaporated by the ſun.

Lakes are alſo divided into thoſe of freſh water, and thoſe of ſalt. Dr. Halley is of opinion, that all great perennial lakes are ſaline, either in a greater or leſs degree; and that this ſaltneſs encreaſes with time: and on this foundation he propoſes a method for determining the age of the world.

Large lakes anſwer the moſt valuable purpoſes in the northern regions, the warm vapours that ariſe from them moderating the pinching cold of thoſe climates; and what is ſtill a greater advantage, when they are placed in warmer climates at a great diſtance from the ſea, the exhalations raiſed from them by the ſun, cauſe the countries that border upon them to be refreſhed with frequent ſhowers, and conſequently prevent their being barren deſarts.

LAMA, the ſovereign pontiff, or rather god, of the Aſiatic Tartars, inhabiting the country of Barantola. The lama is not only adored by the inhabitants of the country, but alſo by the kings of Tartary, who ſend him rich preſents, and go in pilgrimage to pay him adoration, calling him *Lama-Congiu*, i. e. God the everlaſting father of heaven. He is never to be ſeen but in a ſecret place of his palace, amidſt a great number of lamps, ſitting croſs-legged upon a cuſhion, and adorned all over with gold and precious ſtones; where, at a diſtance, they proſtrate themſelves before him, it not being lawful for any to kiſs even his feet. He is called the great lama, or lama of lamas, that is prieſt of prieſts. And to perſuade the people that he is immortal, the inferior prieſts, when he dies, ſubſtitute another in his ſtead, and ſo continue the cheat from generation to generation. Theſe prieſts perſuade the people, that the lama was raiſed from death many hundred years ago, that he has lived ever ſince, and will continue to live for ever.

LAMB, in zoology, the young of the ſheep-kind. See the article SHEEP.

LAMENTATIONS, a canonical book of the Old Teſtament, written by the prophet Jeremiah. The two firſt chapters of this book are employed in deſcribing the calamities of the ſiege of Jeruſalem. In the third, the author deplores the perſecutions he himſelf had ſuffered. The fourth turns upon the deſolation of the city and temple, and the misfortune of Zedekiah. The fifth chapter is a prayer for the Jews in their diſperſion and captivity; and at the end of all, he ſpeaks of the cruelty of the Edomites, who had inſulted Jeruſalem in her miſery. The four firſt chapters of the Lamentations are an abecedary, every verſe or couplet beginning with one of the letters of the Hebrew alphabet, in the alphabetical order. The ſubject is of the moſt moving kind, and the ſtile throughout lively, pathetic, and affecting. "Did we ever find, ſays Dr. South, ſorrow flowing forth in ſuch a natural prevailing pathos, as in the Lamentations of Jeremy? One would think, that every letter was wrote with a tear; that every word was the noiſe of a breaking heart; that the author was a man compacted of ſorrows, diſciplined to grief from his infancy; one who never breathed but in ſighs, nor ſpoke but in a groan."

LAMIÆ, in heathen mythology, a kind of dæmons, in the form of women, ſaid to have devoured children. See DÆMON.

LAMINÆ, in phyſiology, the thin plates whereof many ſubſtances conſiſt.

LAMIUM, dead nettle, in botany, a genus of plants, the flower of which conſiſts of one labiated and ringent petal: the ſeeds are four, triangular, and contained in the bottom of the cup.

The flowers of this plant are ſaid to be good in the fluor albus dyſentery, and ſcrophulous diſorders. The herb is aperient, emollient, and vulnerary.

LAMMAS-DAY, a feſtival celebrated on the firſt of Auguſt by the Romiſh church, in memory of St. Peter's impriſonment.

LAMP, λαμπας, a veſſel containing oil, with a lighted wick. See OIL, FLAME, FIRE, &c.

LAMPADARY, an officer in the ancient church of Conſtantinople, ſo called from his employment, which was to take care of the lamps, and to carry a taper before the emperor or patriarch when they went to church, or in proceſſion.

LAMPAS, LAMPERS, or LAMPRASS, among farriers, a ſwelling and inflammation in the roof of a horſe's mouth, ſo called becauſe it is cured by burning with a lamp or hot iron, in which operation great care ſhould be taken not to touch the bone.

LAMPERN, in ichthyology, a ſpecies of petromyzon, with a ſingle row of little teeth in the verge of the mouth, beſide the lower large ones.

It

It grows to about a foot long, though moſt of thoſe uſually caught are under that ſtandard. See the article PETROMYZON.

LAMPREY, *Lampetra*, another ſpecies of petromyzon, with about twenty rows of teeth. It grows to two feet and a half, or more, in length. It is caught in ſome large rivers near the ſea, but is much leſs frequent than the former ſpecies.

LANCEOLATED LEAF, one reſembling a ſpear's point.

LANCET, a chirurgical inſtrument, ſharp-pointed, and two edged, chiefly uſed for opening veins in the operation of phlebotomy, or bleeding; alſo for laying open abſceſſes, tumors, &c.

LAND, in a limited ſenſe, denotes arable ground. See the articles EARTH, SOIL, and HUSBANDRY.

It is alſo uſed for meadow-ground, paſture, wood, commons, &c. See the articles MEADOW, PASTURE, &c.

LANDSKIP, or LANDSCAPE, in painting, the view or proſpect of a country, extended as far as the eye will reach.

LANGUAGE, an aſſemblage of expreſſions among any people, whereby to communicate their thoughts to each other. And this, change or caprice has eſtabliſhed at firſt; ſo that uſage is the rule of a language, nor has reaſon any thing to do therein, unleſs to ſtudy or teach it, ſuch as it is. Here then commences grammar, which only furniſhes reflections, called rules, to which the manners of ſpeaking, uſed in that language, may be reduced.

Uſage may be divided into good and bad. The difference between theſe is, that the one is better eſtabliſhed than the other. In dead languages, that which makes the good uſage, is the writings of the beſt authors in that language; and thoſe authors are allowed the beſt, who wrote when the ſtate was in its greateſt glory. Thus the age of Auguſtus being the moſt diſtinguiſhed period in the Roman hiſtory, we call that good Latin which is conformable to the manners of ſpeaking uſed by authors who wrote within fifty years before, or after the reign of that emperor. As to the living languages, the good uſage, or mode, is that which obtains amongſt the moſt eminent perſons, whether as to quality and authority, or as to learning, and the reputation of writing well.

There is found a conſtant reſemblance between the genius of each people, and the language they ſpeak. Thus the Greeks, a polite but voluptuous people, had a language perfectly ſuitable, full of delicacy and ſweetneſs. The Romans, who ſeemed only born to command, had a language noble, nervous, and auguſt; and their deſcendants, the Italians, are ſunk into ſoftneſs and effeminacy, which is as eaſily perceivable in their language, as in their manners. The language of the Spaniards is full of that haughtineſs which conſtitutes the diſtinguiſhing character of the people. The French, who have a world of vivacity, have a language that runs extremely briſk and lively. And the Engliſh, who are naturally blunt, thoughtful, and of few words, have a language exceeding ſhort, conciſe, and ſententious. See the articles GREEK, LATIN, ITALIAN, SPANISH, FRENCH, and ENGLISH.

The diverſity of languages is generally allowed to have taken its riſe from the confuſion at the Tower of Babel, both by Jews, Chriſtians, and Mahometans; but the manner in which this diverſity was effected, is ſtill in diſpute among the learned.

As to the point of antiquity and priority among languages, that too has been extremely controverted. The Egyptians and Phrygians diſputed concerning the antiquity of their languages: the Arabs diſpute the point of antiquity with the Jews; but theſe, jealous even to exceſs of the honour of their nation, poſitively inſiſt that the Hebrew tongue, ſuch as is found in the Holy Scriptures, is the primative language, and that ſpoken by the firſt man; while others contend that the Hebrew, Chaldee, and Arabic, are only dialects of the original tongue: however that be, the Arabic is held to be the moſt copious of all languages. See the articles ARABIC, CHALDEE, HEBREW, EGYPTIAN, and PHRYGIAN, &c.

Languages are divided into 1. Original, or mother tongues, as the Hebrew and Arabic in the eaſt (Kircher adds the Cophtic); the Teutonic and Sclavonic in the weſt. And Du Jon maintains the Gothic to be the mother of the Teutonic tongues, namely, thoſe ſpoken in the north; and ſome add the Biſcavan or Bas-Briton, as the mother tongue of the Celtæ or Gauls.

2. Derivative languages, which are thoſe formed out of a mixture of ſeveral others, as French, Latin, &c.

Learned, or dead languages, are thoſe which only ſubſiſt in books, and which muſt be learned by the rules of grammar, as the Greek, Hebrew, Syriac, and Chaldee.

Living languages are thoſe ſtill ſpoken in ſome country, or other, and which may be learned by converſation. The moſt popular among theſe are the French, Italian, Spaniſh, and Engliſh.

Speech is a privilege peculiar to man, and he is likewiſe furniſhed with organs proper for forming an articulate voice: hence it is eaſy to conceive, men might form a ſettled and uniform language, by only affixing an idea to a word, and making others acquainted with it. And it is alſo eaſy to conceive, that the connection betwixt moſt words and things being perfectly arbitrary, they may be changed at different places, at different times, and by different perſons. And it is not very unlikely, that variety of capacities and inclinations, the different occaſions people have to expreſs themſelves, different terms of imagination, the eaſe people find in delivering themſelves

ſelves rather one way than another, the forgetting old words, the many new things met with requiring new names, ſtrangers ſettling among natives, &c. it is not unlikely, that theſe, and many other cauſes, ſhould occaſion an alteration in living languages.

When all mankind inhabited the ſame country, and kept up a commerce with each other, living through many ages, it is no great wonder that the common language was continued amongſt them, without any conſiderable alterations, till after the flood; ſince Noah himſelf was born not long after Adam's death, and a great many antediluvians living in Noah's time might have converſed with Adam and Eve ſome hundred years. Since all the world was then deſtroyed, except Noah and his family, the tongue ſpoken by this patriach muſt be the only remaining language, and which might be eaſily handed down to his poterity, as long as they dwelt in the ſame country. But when, before their parting, they attempted to build a city and tower, God confounded their language, inſomuch, that not being able to underſtand each other, they were forced to ſeparate, and leave the building unfiniſhed.

LANGUED, in heraldry, is applied to ſuch animals whoſe tongues appear out of their mouths, being of a different colour from that of the body.

LANGUOR, a faintneſs or relaxation of the members, owing either to a want or decay of ſpirits.

LANIGEROUS, among herbaliſts, trees that bear ſuch a woolly or downy ſubſtance as is commonly contained in the katkins of the willow, &c. The word is derived from the Latin, *lana*, wool, and *gero*, to bear.

LANIUS, the butcher-bird, in ornithology, a ſpecies of falcon, with black legs, a grey back, and variegated belly.

LANNAR, or LANNERET, the blue-legged falcon, with oblong black and white ſpots. It is a very beautiful bird, about the ſize of a common crow, very bold, and uſually kept for the diverſion of hawking.

LANTANA, in botany, a genus of didynamious plants whoſe flower is monopetalous, with a cylindraceous tube and a plane quadrifid limb; the ſtamina are four very ſmall filaments, topped with roundiſh antheræ: the fruit is a roundiſh unilocular drupe, which includes a bilocular nut, containing two oblong kernels.

LANTERN, or LANTHORN, a well known invention for ſhewing light in the night. The word is derived from the French *lanterne*, which ſignifies the ſame thing.

LANTERN, in architecture, a little dome raiſed over the roof of a building, to give light, and ſerves as a crowning to the fabric.

LANTERNISTS, a denomination aſſumed by the academicians of Thouloufe.

LANUGO, the ſoft down of plants like that growing on the fruit of a peach-tree; whence ſuch plants are termed lanuginous.

LAPATHUM, the dock, in botany, a perennial plant bearing numerous imperfect flowers ſet in double cups; the outermoſt of which conſiſts of three ſmall green leaves, the inner of three larger reddiſh ones, which become a covering to a gloſſy triangular ſeed.

LAPATHUM *acutum folio plano*, ſharp-pointed wild dock, with long, narrow, acuminated leaves, not curled about the edges, and the ſeed-covers indented and marked with little tubercles. The roots are of a browniſh colour on the outſide, and of a yellowiſh within, which grows deeper in drying.

The roots of the ſharp-pointed dock have a biteriſh aſtringent taſte, and no remarkable ſmell: the roots of the other common wild docks are nearly of the ſame quality, equally diſcover their aſtringent matter both to the taſte and by ſtriking an inky blackneſs with a ſolution of chalybeat vitriol, and have been often ſubſtituted in our markets for thoſe of the ſharp-pointed kind; which laſt are generally, and, ſo far as can be judged from their taſte, juſtly accounted the moſt efficacious. They are ſuppoſed to have an aperient and laxative, as well as an aſtringent and corroborating virtue; approaching in this reſpect to rhubarb, but differing widely in degree, their ſtypticity being greater, and their purgative quality, if really they have any purgative quality all, far leſs. They ſtand recommended in habitual coſtiveneſs, obſtructions of the viſcera, ſcorbutic and cutaneous maladies: in which laſt intention, fomentations, cataplaſms, or unguents of the roots have been commonly joined to their internal uſe: in many caſes, the external application alone is ſaid to be ſufficient. A decoction of half an ounce, or an ounce, of the freſh roots, or of a dram or two of the dry roots, is commonly directed for a doſe.

LAPATHUM *rhabarbarum monachorum*, monks rhubarb, garden patience, with large, broad, acuminated leaves; reddiſh branched ſtalks; the leaves that cover the ſeeds unindented, and a tubercle on one of them: the root is of a yellow colour, with red veins, approaching in appearance to rhubarb.

This root is ſuppoſed to poſſeſs the virtues of rhu- in an inferior degree. It is obviouſly more aſtringent than rhubarb, but comes very far ſhort of it in purgative virtue, though given, as uſually directed in double its doſe; nauſeating the ſtomach, without producing any conſiderable evacuation. It com municates a deep yellow tincture both to water and ſpirit.

LAPIDARY, an artificer who cuts precious ſtones. See the articles GEM and DIAMOND.

LAPIDARY STYLE, denotes the ſtyle proper for monumental or other inſcriptions; being a ſort of medium between proſe and verſe. The jejune and brilliant are equally to be avoided.

LAPIDESCENT, that which has the faculty of turning bodies to a ſtony nature.

LAPIS, in general, is uſed to denote a ſtone of any kind. See STONE.

LAPPA, burdock, in Tournefort's ſyſtem, the ſame with the arctium of Linnæus. See the article ARCTIUM.

LAPSA, denotes a patron's neglect or omiſſion to preſent to a church within ſix months after it becomes vacant. When, after a vacancy, the patron does not preſent in ſix months, the ordinary has the next ſix months to collate to the benefice; and if he does not preſent within that time, the metropolitan has farther ſix months to do it in; and if he ſhould fail in doing it in his time, thenext ſix months devolve to the crown.

LAPSANA, nipplewort, in botany, a genus of plants whoſe flower is compound, imbricated, and uniform; conſiſting of a number of hermaphrodite florets, each of which are monopetalous, ligulated, and quinquedentated: it hath no pericarpium; but the ſeeds, which are ſolitary, oblong, and three cornered, are placed in the ſquamæ of the calyx.

LAQUEUS, in ſurgery, a kind of ligature ſo contrived, that when ſtretched by any weight, or the like, it draws up cloſe. Its uſe is to extend broken or disjointed bones, to keep them in their places when they are ſet, and to bind the parts cloſe together.

LARCENY, in law, a felonious carrying away another perſon's goods; and this, according to the value of the things ſtolen, is either grand or petit larceny; the firſt being ſtealing effects above the value of 1*s.* and the laſt ſuch as are either of that value, or under it: but where two perſons together ſteal goods to the value of only 13*d.* it is grand larceny in both; and if one perſon, at different times, ſteal ſeveral different things from the ſame perſon, which amount upon the whole to above 12*d.* value, they may be joined in one indictment, and the offender found guilty of grand larceny; but this is very ſeldom practiſed; on the contrary, the jury, where the theft appears to be the firſt offence, frequently bring in their verdict as they lawfully may, that the things are not above 10*d.* value, and by that means reduce the offence to petit larceny, though the offender may perhaps be indicted for ſtealing to the value of 30 or 40*s.* and upwards. The crime of grand larceny is puniſhable with death, and that of petit larceny, only with the corporal puniſhment of whipping, &c.

LARES, certain inferior deities among the ancient Romans, who were the guardians of houſes; they were alſo ſometimes taken for the guardians of ſtreets and ways, and Tibullus makes them the guardians of the fields.

LARGO, in the Italian muſic, a ſlow movement, one degree quicker than the grave, and two than the adagio. See the articles ADAGIO and GRAVE.

LARIX, the Larch-tree, in botany, a genus of trees, whoſe leaves, which are long and narrow, are produced out of little tubercles, in form of a painter's pencil: the cones are produced at remote diſtances from the male flowers on the ſame tree: the male flowers are very like ſmall cones at their firſt appearance, but afterwards ſtretched out in length.

Theſe trees are propagated by ſeeds, which ſhould be ſown in the beginning of March, upon a bed of light ſoil, expoſed only to the morning ſun: or otherwiſe it may be ſown in pots or boxes of light earth, and placed near a hedge, where they may have the morning ſun only. The ſeed ſhould be covered about half an inch thick with fine light earth, and in very dry weather ſhould be gently refreſhed with water. In about ſix weeks, if your ſeeds were good, your plants will come up, at which time you ſhould carefully guard them againſt the rapacious birds, which would otherwiſe pull off the heads of the plants, as they thruſt themſelves out of the ground with their covers on them: and obſerve to refreſh them with water in dry weather, eſpecially if they are ſown in pots or boxes; as alſo to keep them clear from weeds, which, if ſuffered to grow among the young plants, will ſoon deſtroy them: nor ſhould they be too much expoſed to the ſun, or ſtrong winds; both which are very injurious to theſe plants while they are young: but in October you ſhould, if they are in boxes or pots, remove them into a ſituation where they may be defended from ſharp winds, which are ſometimes hurtful to them, while young; but afterwards they will endure the ſevereſt weather of our climate.

Theſe trees are very proper for the ſides of barren hills, where few other ſorts will thrive ſo well; nor is this tree very delicate in its ſoil, but will grow much better on poor, ſtrong, ſtony land, than in rich ground; and, during the ſummer, they appear very beautiful; but in autumn they caſt their leaves, whereby ſome people have been deceived, by ſuppoſing them dead, and have deſtroyed them.

From the wounded bark of this tree exudes the pureſt Venice turpentine; and on the body and branches of it grows the agaric, which is a drug uſed in medicine.

LARK, *Alauda*, in ornithology, a diſtinct genus of birds; the characters of which are theſe: the tongue, which is membranaceous and pointed, has a rim or margin round it; the beak is ſtraight and pointed; the two chaps equal in ſize; and the claw of the hinder toe longer than any of the other toes.

To this genus belong, 1. The ſky-lark, with the long winged feathers, variegated with white and brown. 2. The tit-lark, with a white line over the eyes. 3. The wood-lark, with the wings obliquely variegated with white. 4. The yellow-breaſted

breasted lark. 5. The snow-bird, or pied chaffinch, with the tail-feathers black, except the three lateral ones, which are white.

LARK-SPUR, delphinium, in botany. See the article DELPHINIUM.

LARMIER, in architecture, a flat square massive member of the corniche, between the cymatium and ovolo.

The word is derived from the French *larmæ*, a tear, as it causes the rain-water to fall at a distance from the wall drop by drop like tears. See CORNICHE.

LARUS, the gull, in ornithology, a genus of the anseres order of birds, thus characterized: the beak is straight all the way, except just at the point, where it turns down; add to this, that it is obtuse, not denticulated along the sides, and its lower chap gibbous or protuberant underneath.

LARINGOTOMY, or BRONCHOTOMY. See the article BRONCHOTOMY.

LARYNX, in anatomy, forms the protuberance in the upper and anterior part of the neck, called pomum Adami: it is termed the head of the trachea arteria, being more prominent in men than in women. It principally consists of five cartilages, as the cartilago thyroides, cricoides, two arytenoides, and the epiglottis; they are connected together by ligaments, and have muscles, glands, and membranes belonging to them.

LASERPITIUM, laserwort, in botany, a genus of umbelliferous plants; the general umbel is uniform; the proper flowers consist each of five equal petals inflexo-cordated at the ends; there is no pericarpium. The fruit is oblong, and seperable into two parts, and is ridged with eight longitudinal membranes: the seeds are two in number, very large, oblong, and semi-cylindric, plane on one side, but on the other ornamented on the back and edges with four membranes.

All the species of laserwort, if wounded, drop a very acrid juice, which turns to a resinous gummy substance, very acrimonious. This was externally applied by the antients to take away black and blue spots that came by bruises or blows, as also to take away excrescences; and was sometimes prescribed by some internally; though others have cautioned against using it this way on account of the violence of its acrimony.

LASSITUDE, *Lassitudo*, in physic, a morbid sensation that comes on spontaneously without any previous motion, exercise, or labour. This is a frequent symptom in acute distempers. It arises either from an increase of bulk, a diminution of proper evacuation, or too great a consumption of the fluid necessary to maintain the spring of the solids, or form a vitiated secretion of that juice.

The remedy in the first case is evacuation, and in the other a proper diet, or such alterative medicines as influence such a secretion.

LAST, in general, signifies the burden or load of a ship.

It signifies also a certain measure of fish, corn, wool, leather, &c. A last of cod-fish, white herrings, meal, and ashes for sope, is twelve barrels; of corn or rape-seed, ten quarters; of gun-powder, twenty-four barrels; of red-herrings, twenty cades; of hides, twelve dozen; of leather, twenty dickers of pitch and tar, fourteen barrels; of wool, twelve sacks; of stock-fish, one thousand; and of flax or feathers, one thousand and seven hundred pounds weight.

LAST, in the marshes of Kent, is applied to a court held by the twenty-four jurats, in which orders are given for the imposing and levying of taxes for preserving the said marshes.

LAST-HEIR, in law, he to whom lands come by escheat, for want of lawful heirs; who, in many cases, is the lord of whom they are held, but in others the king.

LATERAL EQUATION, in algebra, a simple equation, whose root is only in one dimension.

LATERAN COUNCILS, those councils held in the Basilica of the Latin church at Rome. See the article COUNCIL.

There have been five councils held in this place, viz. in the years 1123, 1139, 1179, 1215, and 1513.

A LATERE, a term used to denote the qualifications of cardinals whom the pope sends as legates into foreign courts, who are called legates a latere, as being assistants to his holiness, and counsellors in ordinary; these are the most considerable of the three other legates, being such as the pope commissions to take his place in councils, and so called in regard that he never gives this office to any but his favourites and confidants, who are always *a latere*, at his side.

De LATERE, legates who are not cardinals, but yet are entrusted with an apostolical legation.

LATH, in building, a long, thin, and narrow slip of wood, nailed to the rafters of a roof or ceiling, in order to sustain the covering.

These are distinguished into three kinds, according to the different kinds of wood of which they are made, viz. heart of oak, sap laths, and deal laths; of which the two last are used for ceilings and partitions, and the first for tiling only.

Laths are also distinguished according to their length, into five feet, four feet, and three feet laths, though the statute allows but of two lengths, those of five, and those of three feet, each of which ought to be an inch and a half in breadth, and half an inch in thickness, but they are commonly less.

LATH-BRICKS, bricks much longer than ordinary, used instead of laths, for drying malt; for which purpose they are extremely proper, as not being liable to catch fire, and retaining the heat much longer than those of wood; so that a very small

ſmall fire will ſerve, after they are once heated. See BRICK and MALT.

LATHE, an engine uſed in turning wood, ivory, and other materials. See plate LXIV. *fig.* 3. It is compoſed of two legs or ſtyles, *a a*, which are commonly about two feet ten inches high, on the upper part of which are faſtened two pieces of wood called cheeks, *b*, *b*, parallel to the horizon; between theſe are two pieces of wood, called puppets, *c*, *c*, made to ſlide between the cheeks, and to be fixed down at any point at pleaſure; near the upper end of one of theſe puppets is faſtened a ſtrong ſpike of tempered ſteel, *d*, and oppoſite to it, in the other, is an iron ſcrew, *f*; by theſe the piece to be turned is ſuſtained, and is turned round by means of the ſtring *m*, put round it, and faſtened above to the pliable pole *l*, and underneath to the treddle or board, *i*, moved with the foot; there is alſo a piece of wood between the cheeks, called a reſt, *e*, whoſe office is to reſt the tool upon, that it may lie in a ſteady poſition while the workman uſes it.

When turners perform heavy work, which the pole and treddle will not command, they uſe inſtead of theſe a wheel (*fig.* 4.) which is turned about, ſometimes with one and ſometimes with two handles, according to the weight of the work; its ſtring hath both its ends neatly faſtened together, and this being fixed in a groove round the edge of the wheel, and after being croſſed, put round a groove in the work, it is eaſily turned round with a ſwift and regular motion. This is the moſt expeditious method of working; for the ſpringing up of the pole makes an intermiſſion in the turning of the work, but with the wheel, it always turns the ſame way, ſo that the tool need never be taken off, unleſs it be to examine the work as it is doing.

Braziers, who turn pots, kettles, &c. have their lathe made in a different manner from that uſed by turners, as may be ſeen in *fig.* 5.

The puppets and reſts are much ſtronger than thoſe uſed by the turners: their edge-tools, which they call hooks, are alſo of a different ſhape from the chiſſels and other tools uſed by turners, as may be ſeen *ibid.* marked B 1, B 2, B 3, being bent backwards and forwards at the cutting end. And as the common turners work with a round ſtring made of gut, the braziers work with a flat leather thong, which wrapping cloſe and tight about the rowler of their mandril, commands it with the greater eaſe, and turns it more forcibly about.

Small work in metal is turned in an iron lathe, called a turn-bench, repreſented in *fig.* 6. When this is uſed, it is fixed in the chaps of a vice, and the work being fitted on a ſmall iron axis, with a drill-barrel fitted upon a ſquare ſhank near the end of it, the workman turns it round with a drill-bow, which he holds in his left hand, while he forms the moulding with a graver or other tool, which he holds in his right.

In turning oval or roſe-work, the common turner's lathe muſt be provided with the additional parts repreſented in *fig.* 7. which exhibits the whole machine with all its parts ready for working, A being the fore-puppet, with its apparatus; B, the hinder puppet; C, a hollow axis, turned into a ſcrew-faſhion to direct the weight D, by means of the nut E; and F, the ſupport of the tools, which may be raiſed or lowered at pleaſure.

LATHE, or LETH, as uſed in Kent and Suſſex, is part of a county, containing three or four hundreds.

LATHRÆA, great tooth-wort, in botany, a genus of plants, the corolla whereof conſiſts of a ſingle petal; the tube is longer than the cup; the limb is ringent and ventricoſe; the upper lip is concave, galeated, and broad, with a narrow crooked apex; the inferior one is leſs, and is reflex, obtuſe, and trifid; the fruit is a roundiſh elaſtic capſule, conſiſting of two valves, and containing only one cell; it is covered with a very large patent cup; the ſeeds are few and roundiſh.

LATHYRUS, chickling-pea, in botany, a genus of plants, the corolla of which is papilionaceous; the fruit is a very long, cylindric, or compreſſed, acuminated pod, conſiſting of two valves; the ſeeds are numerous, of a cylindric, globoſe, or ſomewhat angular figure.

LATIFOLIOUS TREES and PLANTS, ſuch as have broad leaves.

LATIN, a dead language, firſt ſpoken in Latium, and afterwards at Rome; and ſtill uſed in the Romiſh church, and among many of the learned.

This language is principally derived from the Greek, and particularly from the Eolic dialect of that tongue, though it has a great number of words which it borrowed from the languages of the Etruſci, Oſci, and other ancient people of Italy; and foreign commerce and wars, in courſe of time, added a great many more.

The Latin is a ſtrong nervous language, perfectly ſuitable to the character of the people who ſpoke it: we have ſtill works of every kind, admirably well written in the Latin, though there are vaſt numbers loſt. The Latin is more figurative than the Engliſh, more harmonious than the French, leſs copious than the Greek, leſs pompous than the Spaniſh, leſs delicate than the Italian, but cloſer and more nervous than any of them.

The Latin tongue was, for a while, confined almoſt wholly within the walls of Rome; nor would the Romans allow the common uſe of it to their neighbours, or to the nations they ſubdued: but, by degrees they in time became ſenſible of the neceſſity of its being generally underſtood, for the conveniency of commerce; and accordingly uſed their endeavours, that all the nations ſubject to their empire, ſhould be united by one common language, ſo that at length they impoſed the uſe of it, by a par-

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ticular law for that purpose. After the translation of the seat of the empire from Rome to Constantinople, the emperors of the East being always desirous of retaining the title of Roman emperors, appointed the Latin to be still used; but at length neglecting the empire of the West, they abandoned all the care of the Latin tongue, and used the Greek. Charlemagne coming to the empire of the west, revived this language; but at length it gave way, and the French took place of the Latin.

The Latin, however, was prodigiously degenerated; for the incursions of the Goths and Vandals, brought an inundation of foreign words into it. But that was not all: when it once got into the courts of justice, it was still worse handled; till at last, being introduced amongst the monks, it was debauched to that degree, that it was almost scandalous to use it.

In this condition it was found at the Reformation, where Lud. Vives, Erasmus, &c. began to open the way for its recovery; since which time, endeavours have been used to retrieve the pure Latinity of the Augustan age. See LANGUAGE.

LATISSIMUS, in anatomy, a large muscle of the back, so called from its great breadth.

LATITAT, in law, a writ whereby all men in personal actions are called originally to the King's-bench: it is so called, as the defendant is supposed to lurk, and cannot be found in the county of Middlesex to be taken by bill; but is gone to some other county, to the sheriff of which this writ is directed, commanding him to apprehend the defendant there.

LATITUDE, in geography, the distance of any place from the equator, measured in degrees, minutes, and seconds, upon the meridian of that place; and is either north or south, according as the place is situated either on the north or south side of the equator: Thus let *l* (plate LXV. *fig.* 1.) represent London, *p* the north pole, *e q* the equator; then will *p l e s* be the meridian of London, and the arch *e l* the latitude of London, which being equal to 51° 32′, the latitude of London, is said to be 51° 32′ north.

The latitude of a place is always equal to the elevation of the pole above the horizon: Thus *l e*, the latitude of London, is equal to the arch *p o*, the elevation of the pole *p* above the horizon *h o*.—For the method of finding the latitude of a place from observations of the sun or stars, see OBSERVATION.

Complement of the LATITUDE, in geography, is the number of degrees, minutes, and seconds, which, added to the latitude, make it equal to 90°: Thus the complement of the latitude of London is 38° 28′; for 38° 28′ added to 51° 32′ is equal to 90°.

The complement of the latitude is always equal to the elevation of the equator above the horizon, or the angle intercepted between the plane of the equator and the plane of the horizon. Thus let *l* (plate LXV. *fig.* 1.) be London, the latitude of London is the arch *e l*; the complement of the latitude is the arch *e h*, which measures the elevation of the equator *e q*, above the horizon *h o*, or the angle *e i h*, intercepted between the planes of the equator and horizon.

Circles of LATITUDE, in astronomy, are secondaries to the ecliptic, or circles drawn on the sphere of the heaven, perpendicular to the ecliptic, and intersecting each other in the poles of the ecliptic.

LATITUDE *of a Star or Planet*, in astronomy, is its distance from the ecliptic in degrees, minutes, and seconds, measured on a circle of latitude drawn through that star or planet, and may be either north or south, as the object is situated either on the north or south side of the ecliptic.

The ecliptic is drawn on the common celestial globes, by which we may see what constellations it passes through; there are also usually six circles of latitude, which by their mutual intersections shew the poles of the ecliptic, as well as divide it into twelve equal parts, answering to the numbers of months in a year. Plate LXV. *fig.* 2. represents a celestial globe, where A G is the ecliptic, N the north, S the south pole of the ecliptic, N A S, N B S, N C S, N D S, &c. are circles of latitude, or rather halves of them, which is as much as can be seen at one view upon the convex of the solid globe. The star H is in so many degrees, minutes, and seconds of north latitude as the arch H A amounts to; the star I is in south latitude, the quantity whereof is measured by the arch I B.

From what has been said, it appears that we must carefully distinguish the different notions of latitude, when applied to stars in the heaven, or places on the earth; that is, between latitude in astronomy, and latitude in geography; for in the heaven, or upon the celestial globe, it is the distance from the ecliptic; but upon the earth, or upon the terrestrial globe, it is the distance from the equator. Indeed, sometimes we consider the distance of the heavenly bodies from the celestial equator; but this is called declination. See DECLINATION.

The latitude of a planet is either heliocentric, or geocentric.

Heliocentric LATITUDE *of a Planet* is the latitude it would appear in to a spectator placed in the sun.

Geocentric LATITUDE *of a Planet*, is the latitude it appears in to an inhabitant of the earth. See GEOCENTRIC *Latitude*.

To illustrate the difference between the heliocentric and geocentric latitude of a planet, let A B (plate LXV. *fig.* 3.) be the orbit of the earth, C D the orbit of Mars, both viewed with the eye in their common section continued, whereby they appear straight lines; let E and F be opposite points of the ecliptic;

Fig. 1. Latitude.

Fig. 2. Latitude.

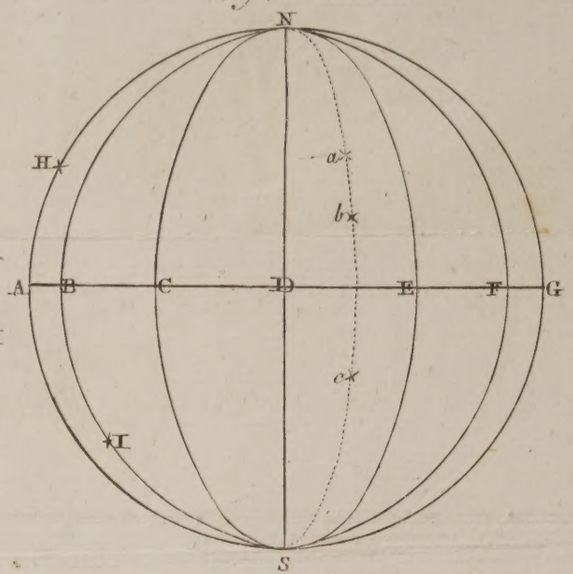


Fig. 4. Latus Transversum.

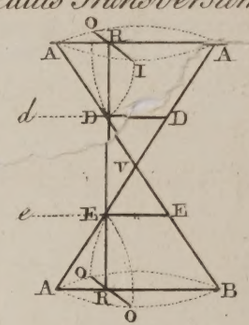
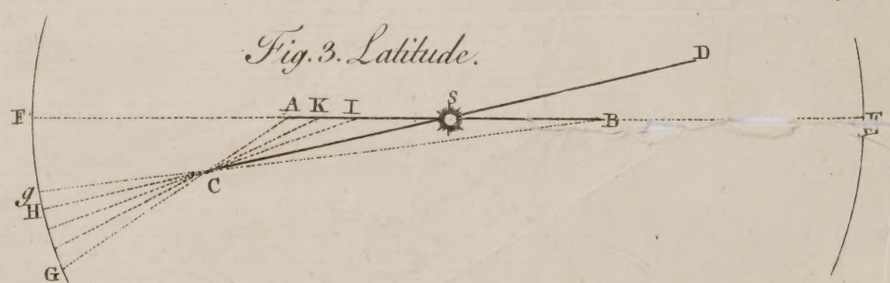
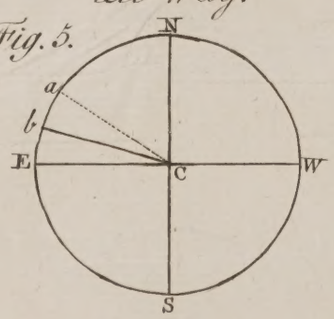


Fig. 3. Latitude.



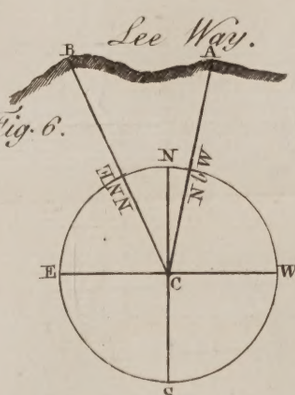
Lee Way.

Fig. 5.



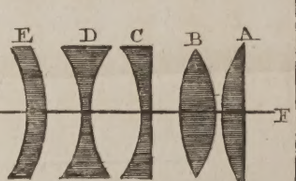
Lee Way.

Fig. 6.



Lens

Fig. 7.



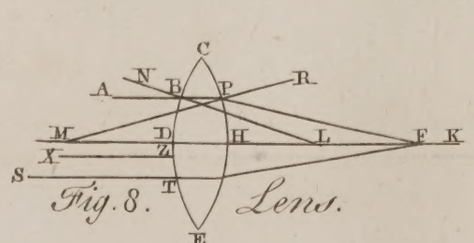


Fig. 8. Lens.

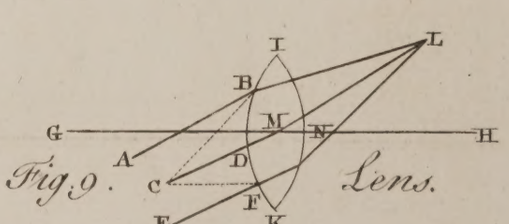


Fig. 9. Lens.

ecliptic: ſuppoſe Mars to be in his ſouth limit at C; if he were at that time viewed from S, the center of the ſun, he would appear in the ſphere of the heaven at the point H; his heliocentric latitude then is F H. But let Mars in C be viewed from the earth, and he will appear in different places, according as the earth is in different parts of her orbit; for if the earth be at B, a line drawn from B through C ſhews the apparent place of Mars to be at *g*, and his geocentric latitude is then F *g*; if the earth be at A, the apparent place of Mars will be in G, and his geocentric latitude F G; if the earth be in any other part of her orbit, as at the point I or K, it is eaſy to ſee, by a line drawn from either of thoſe points through Mars at C, that he will appear in different places in the ſphere of the heaven, and would be in different geocentric latitudes.

North aſcending LATITUDE *of the Moon*, when ſhe proceeds from the aſcending node towards her northern limit or greateſt elongation.

North deſcending LATITUDE, is when the moon returns from her northern limit to the deſcending node.

South deſcending LATITUDE, when ſhe proceeds from the deſcending node to her ſouthern limit.

South aſcending LATITUDE, when ſhe returns from her ſouthern limit to her aſcending node.

And the ſame things hold good of the other planets.

LATITUDINARIAN, a perſon of moderation, with regard to religious opinions, who believes there is a latitude in the road to heaven, which may admit people of different perſuaſions.

LATTEN, a name formerly given to the plates of iron covered with tin, and now uſually called tin, of which our mugs, tea-canniſters, and the like are made.

LATTEN-BRASS, plates of milled braſs, reduced to different thickneſs, according to the uſes it is intended for.

LATUS *Rectum*, in conics, the ſame with parameter. See PARAMETER.

LATUS TRANSVERSUM *of the Hyperbola*, a right line intercepted between the vertices of the two oppoſite ſections; or that part of the common axis, which is between the vertices of the upper and lower cones.

Such is the line E D (plate LXV. *fig.* 4.) where alſo D *d* and E *e* may be the parameters or latus rectums belonging to the two oppoſite ſections D L R O and O E O R.

To this latus tranſverſum anſwers the longeſt diameter in the ellipſis, which Apollonius calls the tranſverſe axis or diameter.

LATUS PRIMARIUM, a right line belonging to a conic ſection, drawn through the vertex of the ſection of the cone, and within it, as the line E E or D D. *fig.* 4.

LAVANDULA, lavender, in botany, a ſhrubby plant, with its leaves ſet in pairs, the ſtalks ſquare when young, and round when grown woody; producing, on the tops of the branches, naked ſpikes of blue labiated flowers, of which the upper lip is erect and cloven, the lower divided into three roundiſh ſegments.

LAVANDULA *Minor ſive ſpica*, lavender with oblong, very narrow, ſomewhat hoary, undivided leaves; a native of dry gravelly ſoils in the ſouthern parts of Europe, common in our gardens, and flowering in July.

The flowers of lavender have a fragrant ſmell, to moſt people agreeable, and a bitteriſh, warm, ſomewhat pungent taſte: the leaves are weaker, and leſs grateful. They are often employed as a perfume; and medicinally, as mild ſtimulants and corroborants, in vertigoes, palſies, tremors, and other debilities of the nervous ſyſtem, both internally and externally.

The flowers are ſometimes taken in the form of conſerve; into which they are reduced, by beating them, while freſh, with thrice their weight of double refined ſugar. Their fragrance is leſs injured by beating or bruiſing them, than moſt of the other odoriferous flowers, but is nevertheleſs conſiderably diminiſhed: the flavour of the leaves is of a much leſs deſtructible kind.

Water extracts by infuſion nearly all the virtue, both of the leaves and flowers. In diſtillation with water, the leaves yield a very ſmall portion of eſſential oil; the flowers a much larger, amounting, in their moſt perfect ſtate, when they are ready to fall off ſpontaneouſly, and the ſeeds begin to ſhew themſelves, to about one ounce from ſixty. The oil is of a bright yellowiſh colour, a very pungent taſte, and poſſeſſes, if carefully diſtilled, the fragrance of the lavender in perfection. It is given internally from one drop to five, and employed in external applications, for ſtimulating paralytic limbs, and for deſtroying cutaneous inſects. The decoction, remaining after the diſtillation of the oil, is diſagreeably bitteriſh, and ſomewhat ſaline.

Rectified ſpirit extracts the virtue of lavender more completely than water. The ſpirit elevates alſo in diſtillation a conſiderable part of the odoriferous matter of the leaves, and greateſt part of that of the flowers; leaving, in the inſpiſſated extracts, a moderate pungency and bitteriſhneſs, with very little ſmell. A ſpirit prepared by pouring a gallon of proof ſpirit on a pound and a half of the freſh gathered flowers, and drawing off five pints by the heat of a water bath, is richly impregnated with the fragrance of the flowers. More compound ſpirits of this kind, in which other aromatics are joined to the lavender, have been diſtinguiſhed by the name of Engliſh or palſy drops. The college of London directs three pints of the ſimple ſpirit of lavender, and one pint of the ſpirit of roſemary, to

be

be digeſted on half an ounce of cinnamon, half an ounce of nutmegs, and three drams of red ſaunders, as a colouring ingredient: the college of Edinburgh orders a gallon and a half of rectified ſpirit of wine to be drawn over from three pounds of freſh lavender flowers, one pound of thoſe of roſemary, and three ounces of lemon-peel; and afterwards three ounces of cinnamon, one of cloves, one of cubebs, and two of red ſaunders, to be macerated for three days in the diſtilled ſpirit. Theſe preparations are taken internally, on ſugar, or in any convenient vehicle, from ten to an hundred drops, and uſed externally in embrocations, &c.

LAVENDULA *Major ſive vulgaris*, broad lavender, with longer, wider, and hoarier leaves, and much larger ſpikes, though ſmaller flowers; common in the ſouthern parts of Europe, but rare among us. The name ſpike is applied by foreign writers to this ſpecies, by ſome of ours to the firſt.

The broad-leaved lavender is ſtronger both in ſmell and taſte than the narrow, and yields in diſtillation almoſt thrice as much eſſential oil; but the flavour both of the oil and of the plant itſelf, is much leſs grateful: the oil is likewiſe of a much darker colour, inclining to green. Watery and ſpirituous extracts, made from the two ſorts of lavender, are very nearly alike; the difference ſeeming to reſide only in the volatile parts.

LAVATERA, in botany, a genus of plants, whoſe flower-cup conſiſts of a double perianthium; the corolla compoſed of five plane heart-ſhaped petals, coaleſcing at their baſe; the filaments are numerous, joining in a column below, and topped with reniform antheræ: the fruit is a verticillated depreſſed arilla, jointed round a columnar receptacle: the ſeeds are ſolitary and kidney-ſhaped.

LAVATORY, or LAVOREDO, an appellation given to certain places in Chili and Peru, where gold is ſeparated from the earth by means of waſhing.

LAUDANUM, a preparation of opium. See the article OPIUM.

LAVENDER, the ſame with lavendula. See LAVENDULA.

LAVENDER-COTTON, in botany. See the article SANTOLINA.

LAVER, a ſacred utenſil in the temple of Jeruſalem, conſiſting of a baſon, whence they drew water by cocks.

LAUNCH, among ſailors, a ſort of boat uſed by the French, Italian, and Spaniſh ſhips; and is peculiar to thoſe which are employed in the Mediterranean trade, being better fitted for the ports of that ſea than a long-boat, than which it is generally much longer, and more flat-bottomed, and alſo ſharper before. See BOAT.

LAUNCHING *a Ship*, or *Boat*, puſhing them into the water from an aſcent.

When the ſhips of the ancients, particularly thoſe of Greece, were launched, they were ornamented with garlands and flowers; the mariners alſo adorned with crowns, who ſhouted with loud acclamations and other expreſſions of mirth and joy; and being purified by a prieſt, with a lighted torch, and egg and brimſtone, or after ſome other manner, were conſecrated to the god whoſe image they bore.

In the launching of ſhips now-a-days, the ſame or ſimilar expreſſions of joy and feaſting are uſed, colours are diſplayed, and ſometimes muſic performed.

The greateſt ſhip ever launched in England was the Britannia, of 100 guns, at Portſmouth; ſuch very large ſhips being uſually built in dry docks, and afterwards floated out by throwing open the flood-gates, and ſuffering the water to enter, when they are finiſhed.

LAUNDER, among miners, a place where they waſh the powdered ore.

LAUNIARD, a rope paſſing alternately through two dead-eyes, to draw them together. See the article DEAD-EYE.

In every dead-eye there are three holes, and two of theſe dead-eyes being faſtened in two ropes, oppoſite to each other, and the launiard paſſing alternately through the firſt hole in the upper, then the firſt hole in the lower, then the ſecond hole in the upper, proceeds till the whole purchaſe is compleated: after which, the launiard, being well greaſed, is drawn extremely tight through all its parts, and draws the rope tight to which the dead-eyes are faſtened: thus the ſhrouds of the maſts are drawn tight by fixing a dead-eye in the lower end of each, with another directly underneath it, which is bolted to the ſhip's ſide by a ſhort chain; the launiard paſſing through theſe, is drawn tight by mechanical powers, and conſequently draws tight the ſhroud to which it is connected. See SHROUD.

LAUNIARD is alſo a ſmall cord or line by which any thing is held faſt, and can be occaſionally looſened, as the launiard of the buoy, the launiard of a port, &c.

LAURA, in church hiſtory, a name given to a collection of little cells, at ſome diſtance from each other, in which the hermits, in ancient times, lived together in a wilderneſs.

Theſe hermits did not live in community, but each monk provided for himſelf in his diſtinct cell. The moſt celebrated lauras mentioned in eccleſiaſtical hiſtory, were in Paleſtine; as the laura of St. Euthymius, at four or five leagues diſtance from Jeruſalem; the laura of St. Saba, near the brook Cedron; the laura of the Towers, near the river Jordon, &c.

LAUREATION, in the univerſities of Scotland, ſignifies the act of taking the degree of maſter of arts, which the ſtudents are permitted to do after four years ſtudy.

LAUREL, in botany, a well known ever-green; it delights in ſhade, and is a great embelliſhment to the parts of a wilderneſs or large ſhrubberies; it is a tree that loves liberty, and therefore very improper for a headed plant: when planted as a hedge it is very beautiful, when properly pruned with a knife, and not with its great enemy the ſheers. It is propagated from berries, cuttings, or layers. Its cover is delightful to all kind of game, as hares, pheaſants, woodcocks, &c. and will thrive in any land that is not over hot. For its generical characters, ſee the article PADUS, of which it is a ſpecies.

LAURENCE, or *Canons regular of St.* LAURENCE, a religious congregation in France, ſaid to have been founded by St. Benedict.

LAURUS, the bay-tree. See the article BAY.

LAURUSTINUS, in botany, a well known flowering ſhrub, much admired for its early blowing in the ſpring: it is propagated by laying down the young branches in autumn, when in a year's time they will be fit to be taken off and planted; the ſeaſon for tranſplanting them is in autumn. For the generical characters of the lauruſtinus, ſee the article VIBURNUM, of which it is held a ſpecies.

LAW denotes the command of ſome perſon or power, whoſe precept carries along with it the reaſon of obedience.

The word is derived from the Saxon *lah*, which ſignifies the ſame thing.

LAW *of Arms*, is a law which gives precepts how to proclaim a war, to attack the enemy, and to puniſh offenders in the camp.

LAWS *of Nature or Motion*, in phyſics, are axioms or general rules of motion and reſt, obſerved by all natural bodies in their actions on one another; of theſe Sir Iſaac Newton has eſtabliſhed the three following:

1. All bodies continue their ſtate of reſt or uniform motion in a right line, till they are made to change that ſtate by ſome external force impreſſed upon them.

This law is no other than the univerſal property of bodies, called paſſiveneſs or inactivity; whereby they endeavour to continue the ſtate they are in, whatever it be. Thus a top only ceaſes to run round, on account of the reſiſtance it meets with from the air, and the friction of the plane whereon it moves. And a pundulum, when left to vibrate in vacuo, where there is nothing to ſtop it but the friction ariſing from the motion of the pin on which it is ſuſpended, continues to move much longer than one in the open air.

2. The change of motion, produced in any body, is always proportionable to the force whereby it is effected; and in the ſame direction wherein that force acts.

This is an immediate conſequence of this axiom, the effect is always proportionable to its cauſe. For inſtance, if a certain force produces a certain motion, a double force will produce double the motion; a triple force, triple the motion, &c. If a body is in motion, and has a new force impreſſed on it in the direction wherein it moves, it will receive an addition to its motion, proportional to the force impreſſed; but if the force acts contrary to its motion, the body will then loſe a proportional part of its motion: again, if the force is impreſſed obliquely, it will produce a new direction in the motion of the body, more or leſs different from the former, in proportion to its quantity and direction.

3. Re-action is always contrary and equal to action; or the actions of two bodies upon each other are equal, and in contrary directions.

Thus, ſuppoſe a ſtone or other load to be drawn by a horſe; the load re-acts upon the horſe, as much as the horſe acts upon the load; for the harneſs, which is ſtretched equally between them both ways, draws the horſe towards the ſtone, as much as it does the ſtone towards the horſe; and the progreſſive motion of the horſe is as much retarded by the load, as the motion of the load is promoted by the endeavours of the horſe. This will be better explained from the following inſtance; let a perſon ſitting in a boat draw another boat equally heavy towards him, they will both move towards each other with equal velocities: let the boat he ſits in be the lighteſt, and it will move the faſteſt; becauſe the action being equal on both ſides, the ſame quantity of motion will be given to each boat, that is, the leſſer will have the greater velocity.

We have a farther confirmation of this from attraction. Suppoſing two bodies attracting one another, but prevented from coming cloſe together by ſome other body placed between them; if their reſpective actions, by which they tend towards each other, were not equal on both ſides, then would the intermediate body be preſſed more one way than the other, and ſo all three would begin to move by themſelves the ſame way; but that three bodies ſhould be put in motion after this manner, when no external force acts upon them, is contrary to experience; conſequently, whatever different degrees of force any two bodies may be capable of exerting, their mutual actions on each other are always equal. This may be tried with a load-ſtone and iron; which being put into proper veſſels, contiguous to one another, and made to float on the ſurface of water, will be an exact counterbalance to each other, and remain at reſt, whatever be the attractive power of the loadſtone, or the proportion of their reſpective magnitudes.

Theſe laws receive an abundant additional proof from hence, viz. that all the concluſions that are drawn from them in relation to the phænomena of bodies, how complicated ſoever their motions be, are always found to agree perfectly with obſervation. The truth of which ſufficiently appears in all parts of the Newtonion philoſophy.

LAWN, a large plain in a park, or adjoining to ſome grand ſeat. The moſt convenient ſituation is on the ſouth or ſouth-eaſt ſide of a houſe. If the lawn be a ſquare, three avenues may break out from three of the angles, and meet in the fourth angle oppoſite to the houſe: it may be bounded with walks or a ſingle row of lime trees ſet at a good diſtance from one another. A circle is a good figure for a lawn, but muſt break off before it comes againſt the front. A triangle is a very proper figure, but ſhould be obtuſe or right angled next the front.

Many perſons have preferred the lime-tree for this purpoſe, on account of their regular growth: but as the leaves of this tree often change their colour, and begin to fall very ſoon in the autumn, occaſioning a great litter in the garden; and from the end of July the trees make but an indifferent appearance; ſo they are not to be eſteemed for theſe plantations.

The elm, oak, beech, and cheſnut, among the deciduous trees, are to be preferred to all others, as they keep their leaves late in autumn: and theſe are all of them large-growing trees; ſo are very proper for this purpoſe.

LAXATIVE MEDICINES, are ſuch as regard either the belly or entire habit, and produce this effect by ſome ſoftening quality that takes away the tenſity of the fibres, and facilitates the paſſage of the contents in the internal tube.

LAY *Brothers*, among the Romaniſts, thoſe pious, but illiterate perſons, who devote themſelves, in ſome convent, to the ſervice of the religious.

LAY *Land*, or LEY *Land*, in huſbandry, fallow-ground, or ſuch as lies untilled. See LEYS.

LAY *Man*, one who follows a ſecular employment, or has not entered into holy orders.

LAY *Man*, among painters, a ſmall ſtatue, either of wax or wood, whoſe joints are ſo formed, that it may be put into any attitude or poſture. Its principal uſe is for adjuſting the drapery in cloathing of figures.

LAYERS, in gardening, are tender twigs or ſhoots of trees, part of which are laid or buried in the ground, till having ſtruck root, they are afterward ſeparated from the parent tree, and become diſtinct plants. Many plants and trees are propagated by laying, when all other methods fail; and particularly thoſe exotic trees which do not produce ſeeds with us. The operation is performed by ſlitting the branches from the middle of a joint upwards a little way (as is practiſed with carnations) and laying them about half a foot in the ground; and if they are not pliable, they ſhould be pegged down with a hook; with ſome plants a twiſt at the place intended to ſtrike root will ſuffice, or by tyeing a piece of wire round the part, and making punctures with an awl juſt above the place of bandage.

If the branches intended to be layed are not within reach of the ground, then it will be neceſſary to make uſe of tubs or pots filled with proper mould, and placed on truſſels, poſts, or ſome ſuch conveniencies, to receive the branches. The ſeaſon for laying down deciduous hardy trees is in October, but for ſuch as are tender, in March, and for evergreens, June or Auguſt are good ſeaſons. Though layers may be laid down at any time, the beforementioned ſeaſons are moſt proper for the reaſons following; becauſe they have the whole winter and ſummer to prepare and draw root; for at theſe times of the year the ſun has ſufficient power on the ſap of the tree to feed the leaf and bud, but has not power ſufficient to make a ſhoot; and if that ſmall quantity of ſap that ariſes be hindered, as it will by ſome of the preceding ways of laying, the leaves and buds will gently crave of the layer, and by that means will prepare the layer to take root or put forth roots a little to maintain itſelf, finding it cannot have a proper ſupply from the mother plant. The harder the wood of a tree is, the young ſhoots will take root the beſt; but if the wood is ſoft, the older branches will more readily root, and conſequently ſooner make a tree.

LAZARETTO, or LAZAR HOUSE, a public hoſpital for the reception of the ſick poor; and in ſome countries it is a detached edifice for perſons coming from places ſuſpected of the plague to perform quarantine in.

LAZARUS, or LAZARO, a military order inſtituted at Jeruſalem by the Chriſtians of the Weſt, when maſters of the Holy Land, who received pilgrims under their care, and guarded them on the roads from the inſults of the Mahometans.

This order was inſtituted in the year 1119, and confirmed by a bull of pope Alexander IV. in 1255, who gave it the rule of St. Auguſtine.

LAZULA, or LAPIS LAZULI, a ſort of ſtone, from whence the celebrated colour called ultramarine is made.

This is one of the ores of copper, the baſis of which is a debaſed cryſtalline matter, coloured with an elegant and beautiful blue. It is a very hard compact ſtone, inſomuch as to come into the rank of thoſe that take a high poliſh, and are not liable to be ſcratched by accidents; and therefore is worked in a number of different toys. It is found in detached lumps uſually of the ſize of a man's fiſt, often ſmaller, and ſometimes of four or five pounds weight: it is never covered with any coat or cruſt, but reſembles thoſe ſtones which have been waſhed off from whole ſtrata, and ſmoothed or rounded by accidents afterwards. It is of a naturally ſmooth and gloſſy ſurface; and its general colour is the colour already mentioned; but this is variegated in a very beautiful manner with ſpots or clouds of white, and with veins of a fine ſhining gold

gold colour. It has these variegations, in different degrees, in several masses, and in general most to be valued, as it has least of them; for though very beautiful to the eye, they are foreign to all the uses they are put to, except when it is cut as a gem. The white clouds or veins, for this matter is sometimes, though more rarely disposed of in the last form, are usually of a dead and opake hue; but sometimes they are bright and pellucid as crystal; this last state of them adds greatly to the beauty of the stone: the yellow ones are always bright and glossy; they have been supposed by many to be veins of gold, and the stone has been thence called a gold ore; but they are in reality only marcasite. Sometimes that gold-like matter is not disposed in veins, but in spots and stars, and in this case the stone is the sapphire of the ancients; for they knew the gem we call the sapphire by a very different name, calling it the sky-blue beryl; and describing what they meant by the word sapphire to be a stone, opake, of a fine blue, and variegated with spots of a gold colour in form of stars. All the variations of this stone are subject, besides, to other accidental foulnesses, and are sometimes debased to the state of a mere common blue copper-colour.

LEAD, *Saturn*, in natural history, a pale or livid white metal, soon losing its brightness in the air, and contracting a blackish or greyish ash-colour; very soft and flexible; unelastic, and unsonorous; the heaviest of all metallic bodies but gold, quicksilver, and platina: it is upwards of eleven times heavier than an equal bulk of water.

It melts in a very small degree of fire, long before it grows red-hot: in a strong red heat it emits visible fumes. It loses of its malleability in proportion as it is heated: by nimble agitation, when it is just ready to melt, or when returning from a fluid to a consistent state, it may be divided into small grains, or powder. Granulated lead is commonly prepared, by pouring the melted metal into a wooden box rubbed on the inside with chalk, and strongly shaking it till it sets or becomes solid; when large quantities are prepared, a wooden trough is made use of. It is formed into round granules or shot, by pouring the melted lead into cold water, through a perforated plate; a little orpiment being added to the metal infusion; this improves its hardness, and makes it run more regularly into globules without drawing a tail.

Lead, when just become fluid, looks bright like quicksilver but presently contracts on the surface a variously coloured powdery pelicle. Some have supposed that this was an heterogenous substance; and that the lead by its separation, became purer. But after this imaginary purification, it will still, upon continuing the fire, exhibit a pelicle as at first: if this be taken off, or the metal stirred, so as to expose a fresh surface to the air, a new one will arise, till by degrees the whole quantity is changed into a dusky powder or calx, called plumbum ustum. The injection of a little fat, charcoal powder, or other inflammable matters, prevents this change, and readily revives the calx into lead again, notwithstanding Boerhaave's assertion that the calx of lead is very hard to reduce.

Calx of lead, exposed to the fire in a furnace so contrived as that the flame may play upon its surface, becomes white, yellow, and at length of a bright red colour; hence the yellow lead or masticot, and the red lead or minium of the painters. See the articles MASTICOT and MINIUM.

If lead be urged with a bright red heat, it changes by degrees into a yellow, flashy scoria, called litharge, of a paler or deeper colour, according to the degree of fire it has undergone. See LITHARGE.

All the calces and scoriæ of lead vitrify more easily than those of any other metal: exposed to a moderately strong fire, they quickly run into a transparent yellow glass. This glass, in fusion, powerfully dissolves and vitrifies the more refractory metallic calces and earths; and unless saturated with these kinds of additions, corrodes and sinks through the common crucible.

If gold or silver be mixt with lead, and exposed to the fire, the lead scorifies, as it would by itself, and arises to the surface, so as to be raked off in the form of glass or litharge; at the same time carrying with it any imperfect metal that the gold or silver had been mixed with, but leaving those perfect metals themselves unhurt. Hence gold and silver are purified by means of lead from admixtures of the baser metals; and hence lead is called by the chemists, *balneum solis & lunæ*, *lavacrum regis & reginæ*, *sapa metallorum*, &c, The litharge met with in the shops is produced in those works where gold and silver are thus purified; and contains the heterogenous metals which the gold or silver had been mixt with.

Lead exposed for sometime to the fleem of vinegar or other vegetable acids, is gradually corroded into a white calx, which is the cerus or white lead of the shops. See CERUSS.

Lead is employed for various mechanic uses; as in thin sheets for covering buildings, for pipes, pumps, cisterns, statues, shot, bullets, windows, for securing iron bars in hard stones, for sundry kinds of large vessels for evaporation, and many other mechanic purposes. It has been observed that plants do not thrive so well in leaden as in earthen and wooded vessels. Its principal use in the chemical arts are for promoting the vitrification of earthy and stony matters, in the making of glass, or in the smelting of ores, or in the glazing of earthen vessels; for the refining of gold and silver; for the eliquation of silver from copper; for forming with oil the basis of varnishes and paints.

The effects of lead on the human body are dangerous;

gerous: thoſe who are expoſed to its vapours in the fire, and even thoſe who grind its calces, minium, ceruſs, and litharge, for the painters, are ſubject to violent gripes and conſtipations of the bowels, contractions of the limbs, and other diſorders. Much more hurtful is the internal uſe of lead corroded or diſſolved by acids, as ceruſs, ſaccharum ſaturni, the ſolution in vinegar called acetum lithargyrii, or the tincture drawn from the ſaccharum with ſpirit of wine, commonly called tinctura antipthiſica. The ſaturnine preparations are applied externally with ſafety, as coolers, repellents, and deſicatives: its calces, diſſolved in oils, form the baſis of moſt of the officinal plaſters.

Culinary veſſels, lined with a mixture of tin and lead, which is the uſual tinning, are apt to communicate to acid foods pernicious qualities, and require to be uſed with great precaution. In Holland, and perhaps in other places, it has been cuſtomary to correct the more offenſive expreſſed oils, as that of rape-ſeed, ſo as to ſubſtitute them to oil of olive or oil of almonds, by impregnating them with lead: this dangerous abuſe may be diſcovered by mixing a little of the ſuſpected oil with a ſolution of orpiment made in lime water; on ſhaking them together, and ſuffering them to ſtand ſome time, the oil, if it has any ſaturnine taint will appear of an orange-red colour; if pure, of a pale yellowiſh. The ſame abuſe has been extended alſo to acid wines, which diſſolve ſo much lead as to acquire a ſweet taſte, and to become ſlow poiſons. The lead is readily diſcovered in theſe likewiſe, by the ſame ſulphureous ſolution, which changes the colour of wines impregnated with this metal to a browniſh red or blackiſh; lead, whether diſſolved, or in its metallic form, being conſtantly ſtained by ſulphureous liquors or vapours.

Lead is ſometimes found in the earth native, or in its metallic form, though very rarely pure. Its common ores are nearly of the colour of lead itſelf, and appear compoſed of cubes or parallelopipeds, ſometimes large and regular, ſometimes irregular and ſmall. There are lead ores alſo of a white, greyiſh, or greeniſh colour, and priſmatic figure; but theſe are rarely met with. The ores of ſilver, copper, and other metals, except tin and iron, have often a lead ore intermixed. The lead is extracted by fuſion in contact with the fuel; the furnace being ſufficiently heated with wood or charcoal, the powdered ore is thrown in by degrees, and freſh fuel and ore occaſionally ſupplied: the lead, revived by the inflammable matter of the coals, runs down into a baſon at the bottom of the furnace; from whence it is laded out and caſt into iron moulds, into large maſſes, called pigs of lead. All the common lead ores contain ſome ſilver; the ſteelgrained, and ſuch as are compoſed of ſmall cubes, have generally more ſilver than the compact and large diced ſorts: the white and green ſcarcely hold any. The ſilver is extracted, when its quantity is conſiderable enough to bear the expence of extracting it, by ſcorifying the lead upon a teſt; the whole being kept in fuſion on a hearth made of bone-aſh, or other like materials, the lead partly vitrifies and ſinks into the hearth, and partly turns to litharge, which floats on the ſurface, and is raked or blown by bellows to one ſide; the ſilver at length remaining by itſelf. Lead almoſt always contains ſome portion of copper; and hence the ſilver obtained in this operation is ſcarcely ever free from ſome admixture of that metal.

LEADWORT, in botany. See the article PLUMBAGO.

LEAF, *Folium*, a very eſſential and ornamental part of plants, whoſe chief office is to ſubtiliſe and give more ſpirit to the abundance of nouriſhing ſap, and to convey it to the buds of the future ſhoots, which are always formed either at the baſe of the leaf, or its footſtalk.

Leaves are properly the moſt extreme part of a branch, extending into ſome determinate length, breadth, and figure, and are furniſhed with veins and nerves.

Botaniſts conſider the leaves with regard to their ſtructure, ſurface, ſhape, conſiſtence, edges, ſituation, and ſize: with regard to their ſtructure, they are either ſingle, as thoſe of the apple, pear, and plumb tree, or compound, as thoſe of the ſtrawberry, parſley, &c. a ſingle leaf is one which is either immediately joined to the branch or connected with it by a footſtalk; a leaf is ſaid to be compound, when there are more than one upon a petiole or footſtalk: with reſpect to their ſurface, they are either flat, as the origany, or in bunches, as the houſeleek: with regard to their ſhape, they are either lanceolated, cordated, acuminated, haſtated, &c. (ſee LANCEOLATED, &c.) and are either thin and fine, as thoſe of the hypericum; or thick and groſs, as thoſe of purſlane; or fleſhy, as thoſe of ſeveral kinds of aloes; or woolly; as thoſe of marſh-mallows: with regard to their edges, leaves are cut ſlightly, as in ſome ſpecies of geums, or deep, as in ſome of the centaurys: with reſpect to their ſituation, they are either ranged alternately, as the alaternus; or oppoſite to each other, as the phillyrea, mint, baum, &c. with regard to their ſize, they are either very large, as thoſe of the muſa; or moderate, as thoſe of the fig and vine; or ſmall, as thoſe of the elm or apple-tree; or very ſmall, as thoſe of the heath, phylica, &c.

Many ſorts of plants, whoſe roots iſſue forth from the ſmall end of the ſeed, put out two ſmall leaves that are very unlike thoſe which the plant afterwards produceth; for as ſoon as the root has taken hold of the ground, between theſe falſe leaves (commonly called the ſeed-leaves) there comes forth a ſhoot which produces leaves like thoſe of the mother plant;

plant: of this manner of growth there is an infinite number of plants.

Naturaliſts generally aſcribe a four-fold uſe to leaves.

1. Chiefly that they do, in the ſpring time, receive the crude humours into themſelves, divide them very minutely, and move them ſtrongly in the utricles, and, perhaps, draw in from the air, what is neceſſary, though unknown to us, and carry back great plently of elaborated juice to the plant.

2. That there may be a tranſpiration of what is unprofitable, anſwering to the diſcharge made by ſweat; for ſometimes theſe excretory veſſels of the leaves, are ſo overcharged by the great plenty of diſtending humour, or juice, that they burſt in the middle, and let go the more ſubtile parts; nor is it ſeldom that, in a hot ſeaſon, great plenty of juices are this way diſcharged and imbibed: thus, manna is found to exude, or ſweat forth, from the leaves of certain trees, if a cold night ſhould follow a hot day; and the ſame thing frequently happens in divers other plants and trees, as we learn from bees flying to the lime-tree that they may gather that gummous ſubſtance from the leaves, and it is from the ſurface of the leaves, as well as from the flowers, thoſe animals collect their honey; but if the heat ſhould be leſs, all the ſuperfluous humours, except thoſe which, perhaps, are tranſmitted by inſenſible tranſpiration through the arterial veſſels, exhaling naturally, are ſeen to return into the trunk.

3. That the bibulous veſſels dried by the diurnal heat (and for this reaſon may be compared to veins) may imbibe in the night time, eſpecially thoſe watery parts which, among others, lie hid in the air, under the form of a very thin due, and therefore ſupply the loſs, made by the arteries, by the new moiſture received.

4. Laſtly, The leaf ſerves chiefly for this purpoſe, that it may keep, or nouriſh, the eye, or germ, till the germ, by degrees, growing out to a greater bulk, preſſes together the veſſels of the footſtalk, whence the humour is, by little and little, ſtopped in the leaf, till it cannot any more return to the footſtalk, which, by the ceaſing of the afflux and reflux of the nutritious juice, grows putrid; whence, a conſumption being cauſed, the leaf dies and falls off, which is the chief cauſe of the falling of the leaves in autumn.

Some have made obſervation, that all evergreens have their wood cloſe and compact between their annular circles, and that their holding their leaves all the winter, proceeds from the nature of their ſap, which is of a clammy and turpentine nature; and that this ſap is eaſily condenſed by cold, and requires a conſiderable ſhare of heat to make it thin and put it in motion: thus, a little cold condenſes pitch or turpentine, but it muſt be a froſt that ſtays the motion of the water; whence it happens, that thoſe trees which hold their leaves, will grow much better under the droppings of other great trees, than ſuch as ſhed their leaves; becauſe their turpentine ſap ſhoots off the drops, and prevents their entering the veſſels in too great quantities.

Dr. Hales ſays (in his Treatiſe on Vegetation) it is plain, from many experiments and obſervations which he mentions, that leaves are very ſerviceable in the work of vegetation, by being inſtrumental in bringing nouriſhment from the lower parts within the reach of the attraction of the growing fruit, which, like young animals, is furniſhed with proper inſtruments to ſuck it thence. But the leaves ſeem alſo deſigned for many other important ſervices, for nature admirably adapts her inſtruments ſo as to be, at the ſame time, ſerviceable to many good purpoſes. Thus the leaves, in which are many excretory ducts, ſeparate and carry off the redundant watery fluid, which, by being long detained, would turn rancid and prejudicial to the plant, leaving the more nutritive parts to coaleſce, part of which nouriſhment, we have good reaſon to think, is conveyed into vegetables through the leaves, that plentifully imbibe the dew, which contains ſalt, ſulphur, &c. for the air is full of acid and ſulphureous particles, which, when they abound much, do, by the action and re-action between them and the elaſtic air, cauſe that ſultry heat which uſually is attended with lightning and thunder; and theſe new combinations of air, ſulphur, and nitrous ſpirit, which are conſtantly forming in the air, are doubtleſs very ſerviceable in promoting vegetation, when, being imbibed by the leaves, they may not improbable be the materials out of which the more ſubtile and refined principles of vegetables are formed; for ſo fine a fluid as the air, ſeems to be a more proper medium wherein to prepare and combine the more exalted principles of vegetation, than the groſſer watery fluid of the ſap.

That there is plenty of theſe ſulphureous particles conveyed in the leaves, is evident, from the exudations that are found on their edges, of which the bees are obſerved to make their waxen cells, as well as from the duſt of the flowers; and that it abounds with ſulphur, is plain, from its burning freely; whence it appears, that the great uſe of leaves is to perform, in ſome meaſure, the ſame office, for the ſupport of vegetable life, as the lungs of animals do for the ſupport of animal life; plants, very probably, drawing through their leaves ſome part of their nouriſhment from the air.

Leaf, in architecture, the repreſentation of the leaf of the acanthus on the capital of the Corinthian and Compoſite orders. See the articles Corinthian and Composite.

Leaf, in clocks and watches, an appellation given to the notches of their pinions. See the articles Clock and Watch.

LEAGUE, a meaſure of length, containing more

or leſs geometrical paces, according to the different uſages and cuſtoms of countries. A league at ſea, where it is chiefly uſed by us, being a land meaſure moſtly peculiar to the French and Germans, contains three thouſand geometrical paces, or three Engliſh miles.

The French league ſometimes contains the ſame meaſure, and in ſome parts of France it conſiſts of three thouſand five hundred paces: the mean or common league conſiſts of two thouſand four hundred paces: the little league of two thouſand. The Spaniſh leagues are larger than the French; ſeventeen Spaniſh leagues making a degree, or twenty French leagues, or ſixty nine and an half Engliſh ſtatute miles. The Dutch and German leagues contain each four geographical miles. The Perſian leagues are pretty near of the ſame extent with the Spaniſh; that is, they are equal to four Italian miles; which is pretty near to what Herodotus calls the length of the Perſian paraſang, which contained thirty ſtadia, eight whereof according to Strabo, make a mile.

LEAGUE alſo denotes an alliance or confederacy between princes and ſtates for their mutual aid, either in attacking ſome common enemy, or in defending themſelves.

LEAK, among ſailors, a cranny or hole through which water enters into a ſhip either through her deck or ſides.

LEAKAGE, the ſtate of a veſſel that leaks, or lets water, or other liquid, ouze in or out.

Leakage, in commerce, is an allowance of 12 per cent. in the cuſtoms allowed to importers of wines for the waſte and damage it is ſuppoſed to have received in the paſſage: an allowance of two barrels in twenty-two is alſo made to the brewers of ale and beer, by the exciſe office.

LEAP, *Salto*, in muſic, is when the ſong does not proceed by conjoint degrees, as when between each note, there is an interval of a third, fourth, fifth, &c. See DEGREE and CONJOINT.

LEAP YEAR, the ſame with biſſextile. See BISSEXTILE.

LEASE, in law, a demiſe or letting of lands, tenements or hereditaments unto another for life, term of years, or at will, for a rent reſerved.

LEASE and RELEASE, as uſed in our law, ſignifies a certain inſtrument, in writing, for the conveyance of a right or intereſt in lands and tenements in fee to another

LEASH, among ſportſmen, denotes three creatures of any kind; but chiefly greyhounds, foxes, bucks, and hares.

The term leaſh alſo ſignifies a line to hold in a hunting dog; and a ſmall long thong of leather, by which a falconer holds his hawk.

LEATHER, the ſkin of ſeveral kinds of beaſts, dreſſed and prepared for the uſe of the various manufactures, whoſe buſineſs is to make them up. The butcher and others who flay off their hides or ſkin, diſpoſe of them raw or ſalted to the tanner and tawer, and then to the ſhamoy, Morocco, and other kind of leather dreſſers, who prepare them according to their reſpective arts, in order to diſpoſe of them among the curriers, glovers, harneſs-maker, coach-makers, ſaddlers, breeches makers, gilt leather-makers, chair-makers, ſhoe-makers, book-binders, and all in any way concerned in the article of leather.

The three principle aſſortments of leather are tanned or tawed, and oil and alum-leather; and it may be affirmed, with great truth, that the ſkins of our own production, and thoſe imported from our colonies, when dreſſed in this kingdom, make the beſt leather in the world, and that therefore this is an article of great importance to the trade of the nation.

Though there is no little difference between the dreſſing of ſhamoy-leather, alum-leather, Hungary leather, Morocco leather, parchment, and tanning; yet the ſkins which paſs through the hands of theſe ſeveral workmen, ought to have been for the moſt part, at leaſt waſhed clean from blood and impurities in a running water; ſet to drain, worked with the hands, or pounded with wooden peſtels in a vat; put into the pit, which is a hole lined either with wood, or with ſtone and mortar, filled with water in which quick-lime is diſſolved, in order to looſen the hair that it may be eaſily rubbed off without injuring the ſkin; drawn out, and ſet to drain on the edge of the pit; ſtretched on the leg or horſe, in order to have the hair ſcraped off with a blunt iron-knife, or wooden cylinder; the membranes on the fleſhy ſide, and the ſcabs or roughneſs on the grain-ſide, pared off with a ſharp-knife, and the ſkins rubbed with a whetſtone, to take off any particles of the lime, or any thing elſe that may occaſion hardneſs; thickened by different ſorts of powder, whereby they become greater in bulk, and ſo much lighter as gradually to riſe to the ſurface of the water; ſtretched out green or half dried, and piled one over another; or put up ſeparate after they are dried, and hung out to air upon poles, lines, or any other way: which muſt be repeatedly done in the dreſſing of ſmall ſkins. This alternate tranſition from the liquid of the air into that of water, and from water in the air, with the aſſiſtance of lime, ſalts, and oils, opens the inmoſt fibres of the ſkin ſo effectually, as greatly to facilitate the introduction of ſubſtances proper for making them pliant, without rendering them thinnner.

The alum leather dreſſer-dreſſes all ſorts of white leather from the ox-hide to the lamb ſkin; for dreſſing the ſadler's leather, he uſes bran, ſea-ſalt, and alum; and for that which the glover uſes, after the common preparatives, he firſt employs bran, and

then with ſalt, alum, fine flower, and yolks of eggs mixed in hot water, he makes a ſort of pap, with which the ſkins are ſmeared in a trough.

The ſhamoy leather-dreſſer ſoaks in oil, not only the ſkins of the true ſhamoy (which is a wild goat) but likewiſe thoſe of all other goats. The tanner uſes the bark of young oaks ground in a tanning-mill, in which he ſoaks the ſkins more or leſs, according to the different ſervices expected from them, their chief uſe being to remain firm and keep out water. In certain caſes, inſtead of tan, he uſes redon, which is chiefly uſed for tanning ram, ſheep-ſkins, and dreſſing Ruſſia leather. But for the different methods in which the tanner, currier, Ruſſia and Morocco leather-dreſſers, proceed, in finiſhing their ſkins, ſee the articles CURRYING, TANNING, &c.

LEAVEN, a piece of ſour dough, uſed to ferment and render light a much larger quantity of dough or paſte.

LECHEA, in botany, a genus of plants whoſe flower conſiſts of a triphyllous cup, with three oblong petals and three ſtamina: the fruit is an ovate, triquetrous, trilocular capſule, containing three egg-ſhaped ſeeds, angulated on their backs.

LECTICA, in Roman antiquity, a vehicle in which people were carried in a reclining poſture.

LECTISTERNIUM, a religious faſt or banquet of the ancient Romans. In times of public danger or calamity, or of thankſgiving for ſome happy event, the republic ordered ſolemn feaſts to be made for the gods; and this ſolemnity was called lectiſternium, becauſe on this occaſion they ſpread tables, and placed beds around them, on which their heavenly gueſts were to lie and eat.

LECTURERS, in England, are an order of preachers in pariſh churches, diſtinct from the rector or vicar. They are choſen by the veſtry, or chief inhabitants of the pariſh, and are uſually the afternoon preachers.

LEDGER, the principal book wherein merchants enter their accounts. See BOOK-KEEPING.

LEDUM, wild roſemary, in botany, a plant which grows naturally in moiſt places in ſeveral parts of England: it riſes with a ſlender ſhrubby ſtalk, dividing into many branches, which are furniſhed with narrow leaves: the flowers come out in cluſters at the ends of the branches, each having five oval hollow petals, and ten ſtamina: the fruit is a roundiſh capſule, with five cells, which are filled with ſmall narrow pointed ſeeds.

LEE, in the ſea language, that part of the hemiſphere to which the wind bloweth, in oppoſition to the weather or windward ſide. This expreſſion however is only uſed in a ſhip, when the wind croſſes the line of her courſe at a greater or leſs angle; and hence

Under the LEE implies farther to lee-ward, or farther from that part of the horizon from which the wind bloweth, as

Under the LEE *of the Shore*, i. e. at a ſhort diſtance from that ſhore which lies to the wind-ward, or from the land where the wind blows from. This phraſe is commonly uſed to expreſs the ſituation of a ſhip or boat which may be anchored, or ſailing under the weather-ſhore, where there is always ſmoother water and leſs danger of heavy ſeas than at a great diſtance from it.

The Land appears under our LEE, i. e. at ſome diſtance from a ſhip on that ſide to which the wind bloweth, as it thwarts her way: and hence

LEE-LARCHES, the ſudden roll which a ſhip makes to lee-ward in a high ſea, when a large wave ſtrikes her, and bears her weather-ſide violently up, which depreſſes the other in proportion.

LEE-SIDE is the ſide of a ſhip which is fartheſt from the wind, as oppoſed to the weather-ſide, which is neareſt to it.

Thus, admit a ſhip to be ſailing northward with the wind at weſt, then her ſtarboard, or right ſide, is the lee-ſide, and the larboard, or left, the weather-ſide.

To LEE-WARD, towards that part of the hemiſphere which lies under the lee, or to which the wind bloweth.

LEE-WARD-SHIP, a ſhip that, going cloſe-hauled, loſes much ground, and deviates further to lee-ward from her courſe than common. See the article CLOSE-HAULED.

LEE-WAY is the angle that the rhumb-line, upon which the ſhip endeavours to ſail, makes with the rhumb upon which ſhe really ſails.

This is occaſioned by the force of the wind, or ſurge of the ſea, when ſhe lies to the windward, or is cloſe hauled; which cauſes her to fall off and glide ſide-ways from the point of the compaſs ſhe capes at. Thus, let N E S W (plate LXV. *fig.* 5.) repreſent the compaſs, and ſuppoſe a ſhip at C capes at, or endeavours to ſail upon the rhumb C *a*, but by the force of the wind and ſurge of the ſea ſhe is obliged to fall off, and make her way good upon the rhumb C *b*; then the angle *a* C *b* is the lee-way: and if that angle be equal to one point, the ſhip is ſaid to make one point lee-way; or if equal to two points, the ſhip is ſaid to make two points lee-way, &c.

The quantity of this angle is very uncertain; becauſe ſome ſhips, with the ſame quantity of ſail, and with the ſame gale, will make more lee-way than others; it depending much upon the mould and trim of the ſhip, and the quantity of water that ſhe draws. However, the common allowances made for lee-way, are theſe: 1. If the ſhip be cloſe hauled, has all her ſails ſet, the water ſmooth, and a moderate gale of wind, ſhe is ſuppoſed to make little or no lee-way. 2. If it blow ſo freſh, as to cauſe

cauſe the ſmall ſails to be handed, it is uſual to allow one point. 3. If it blow ſo hard, that the tops muſt be cloſe reeft, the ſhip then makes about two points lee-way. 4. If one topſail muſt be handed, it is common to allow two and three-quarter or three points lee-way. 5. When both topſails muſt be handed, they allow about four points lee-way. 6. When it blows ſo hard as to occaſion the fore courſe to be handed, the allowance is between five and a half and ſix points. 7. When both main and fore courſes muſt be handed, then ſix, or ſix and a half points muſt be allowed for her lee-way. 8. When the mizzen is handed, and the ſhip is trying a-hull, ſhe then makes her way good about one point before the beam, that is, about ſeven points lee-way.

Though theſe rules are ſuch as are generally uſed, yet as the lee-way depends much upon the mould and trim of the ſhip, we ſhall here give the method of aſcertaining it by obſervation; thus let the ſhip's wake be ſet by a compaſs in the poop, and the oppoſite rhumb is the true courſe made good by the ſhip; then the difference between this and the courſe given by the compaſs in the bittacle, is the lee-way required. If the ſhip be within ſight of land, the lee-way may be exactly found by obſerving a point of the land which continues to bear the ſame way; for the diſtance between the point of the compaſs it lies on, and the point the ſhip capes at, will be the lee-way. Thus, ſuppoſe a ſhip at C (*fig.* 6.) is lying up at N *b* W, towards A; but inſtead of keeping that courſe, ſhe is carried on the N N E line C B, and conſequently the point B continues to bear always the ſame way from the ſhip: here it is evident, that the angle A C B, or the diſtance between the N *b* W line that the ſhip capes at, and the N N E line that the ſhip really ſails upon, will be the lee-way. See the articles COMPASS, COURSE, JOURNAL, &c.

LEECH, *Hirudo*, in zoology. See the article HIRUDO.

LEECH *of a Sail*, the perpendicular or upward ſloping-edges of a ſquare, oblong, or triangular ſail: in a ſquare or oblong ſail, the leeches are thoſe which are perpendicular, as oppoſed to the upper-edge, which is called the head, and to the lower, which is called the foot of the ſail. In triangular ſails, when there are only three ſides, two of them are called the fore and after-leeches, and the third, which is the lower-edge, the foot.

LEECH-LINE, one of the brails of the main-ſail and fore-ſail, or one of thoſe cords which draw them together in a lump, when they are to be furled or reefed. See the articles BRAIL and FURL.

The leech-line is ſo called from its being faſtened to the ſail in or near the middle of the leech.

LEECH-ROPE, the rope to which the leech of the ſail is ſewed. See the article BOLT-ROPE.

LEEK, a garden plant, called by botaniſts porrum. See the article PORRUM.

Leeks are commonly ſown along with onions; the onions growing up firſt are pulled up, ſo that the leeks have room to grow to their full ſize.

LEER, in glaſs-making, a furnace where the veſſels are allowed to cool by degrees. See GLASS.

LEES, the more groſs and ponderous parts of liquors, which, being ſeparated by fermentation, fall to the bottom.

A ſpirit of a very agreeable flavour is obtained, by the common proceſs of diſtillation from wine lees; and as this flavour depends greatly on the eſſential oil of the lees, care ſhould be taken to bring it over with the ſpirit. In order to this, the ſolid lees muſt be ſteeped in ſix or eight times their own weight of water, and well ſtirred at times, before they are put into the ſtill. See DISTILLATION.

LEET, *Leta*, a little court held within a manor, and called the king's court, on account that its authority to puniſh offences originally belonged to the crown, from whence it derived to inferior perſons. See COURT-LEET.

LEG, *Crus*, in anatomy, includes the whole of the lower extremities, from the os innominatum to the toes, being commonly divided into thigh, leg, and foot. See the articles THIGH and FOOT.

LEGACY ſignifies any thing that is particularly given or bequeated by a laſt will and teſtament. See WILL and TESTAMENT.

LEGATE, a cardinal or biſhop, whom the pope ſends as his ambaſſador to ſovereign princes. See AMBASSADOR.

There are three kinds of legates, viz. legates a latere, legates de latere, and legates by office, or legati nati: of theſe the moſt conſiderable are the legate a latere, the next are the legates de latere. See the article A LATERE.

Legates by office are thoſe who have not any particular legation given them, but who by virtue of their dignity and rank in the church become legates; ſuch are the archbiſhops of Rheims and Arles; but the authority of theſe legates is much inferior to that of the legates a latere.

LEGATUS, in Roman antiquity, a military officer who commanded as deputy of the chief general.

LEGEND, an idle or ridiculous ſtory told by the Romaniſts concerning their ſaints, and other perſons, in order to ſupport the credit of their religion.

LEGER-LINE, in muſic, one added to the ſtaff of five lines, when the aſcending or deſcending notes run very high or low: there are ſometimes many of theſe lines both above and below the ſtaff, to the number of four or five.

LEGGIARDO, or LEGGIARDEMENTE, in muſic,

Fig. 1. Lens.

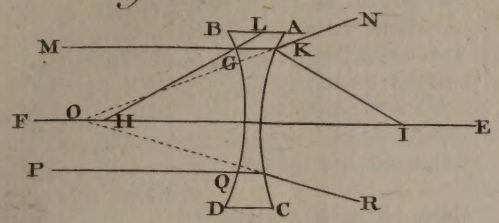


Fig. 2. Lens.

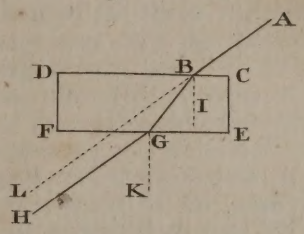
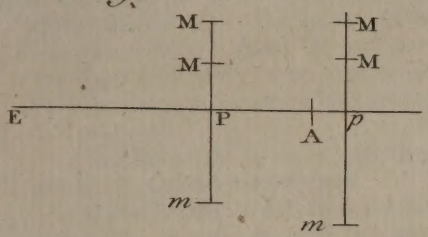


Fig. 3. Locus.



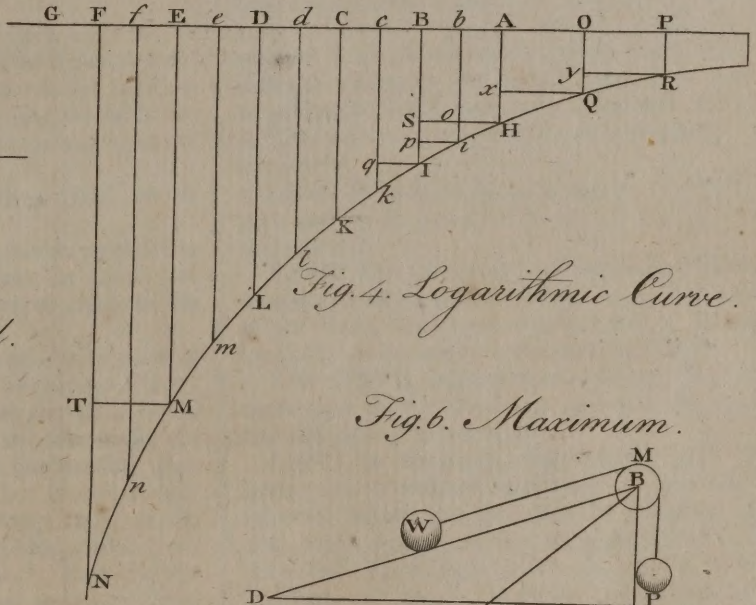


Fig. 4. Logarithmic Curve.

Fig. 5. Logarithmic Spiral.

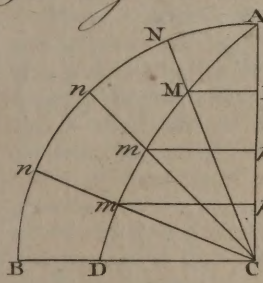
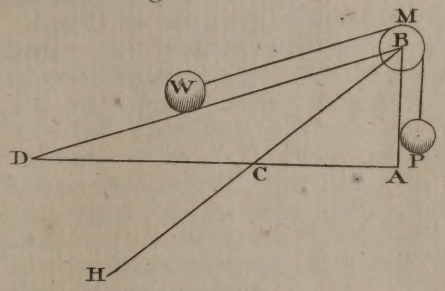


Fig. 6. Maximum.



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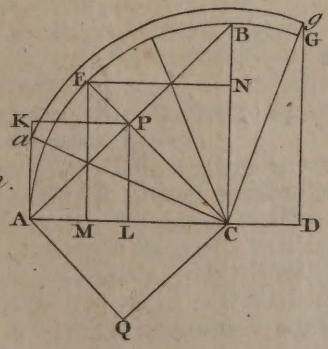
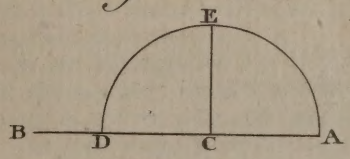


Fig. 8. Maximum.



J. Lodge sculp.

muſic, ſignifies to play or ſing in a lively, briſk, and gay manner.

LEGION, in Roman antiquity, a body of foot which conſiſted of ten cohorts.

The exact number contained in a legion, was fixed by Romulus at three thouſand; though Plutarch aſſures us, that after the reception of the Sabines into Rome, he encreaſed it to ſix thouſand. The common number afterwards, in the firſt times of the free ſtate, was four thouſand; but in the war with Hannibal it aroſe to five thouſand, and after this it is probable that it ſunk again to four thouſand, or four thouſand two hundred, which was the number in the time of Polybius.

LEGISLATOR, or LAW-GIVER, he who frames laws for any ſtate or kingdom.

LEGITIMATION, an act whereby illegitimate children are rendered legitimate. See the article BASTARD.

LEGUME, *Legumen*, among botaniſts, denotes a pericarpium of an oblong compreſſed figure, formed of two valves, joined by a viſible ſuture both on the upper and under parts, and having the ſeeds affixed to the upper limbs of the two valves, in an alternate order.

LEGUMINOUS, an appellation given to all plants whoſe fruit is a legume.

LEMMA, in mathematics, a previous propoſition laid down, in order to clear the way for ſome following demonſtration; and is prefixed either to the theorems or problems.

Thus, to prove a pyramid one third of a priſm of the ſame baſe and height with it, as the demonſtration is difficult, this lemma may be premiſed, which is proved in progreſſion, "That the ſum of the ſeries of the ſquares of numbers in arithmetical progreſſion, beginning from o, 1, &c. is always ſubtriple of the ſum of as many terms equal to the greateſt; or is always one third of the greateſt term multiplied by the number of terms." And, in like manner to find the inflection of any curve, this lemma is firſt premiſed, "That a tangent may be drawn to the given curve in a given point;" and ſo in phyſics, medicine, &c.

LEMNA, duck-weed, in botany, a genus of plants, producing diſtinct hermaphrodite and female flowers: neither of which have any flower petals: the ſtamina are two ſubulated filaments; and the fruit is a globoſe, unilocular capſule.

LEMON, *Limon*, in botany, a genus of trees with large ſtiff leaves like the citron, without any appendage at the bottom; the flower conſiſts of many leaves, which expand in form of a roſe: the fruit is almoſt of an oval figure, and divided into ſeveral cells, in which are lodged hard ſeeds ſurrounded by a thick fleſhy ſubſtance, which, for the moſt part, is full of an acid juice.

All ſorts are propagated by budding or inarching them either on ſtocks of lemons or citrons produced from ſeeds, but they will not readily unite on orange ſtocks; for which reaſon the citrons are preferable to either oranges or lemons for ſtocks, as they readily join with either ſort; and being of larger growth, cauſe the buds of the other ſorts to be much ſtronger than if they were on ſtocks of their own kind.

The culture of the lemon is the ſame with that of the orange-tree, with this difference only, the former being hardier than the latter, will conſequently bring their fruit to maturity with us much better than the orange will, and therefore require to have a greater ſhare of freſh air in winter; for which reaſon they ſhould always be placed near to the doors or windows of the green-houſe: and in ſome curious gardens theſe trees have been planted againſt walls, where, by covering them with glaſſes in winter, and protecting them from ſevere froſts, they have produced plenty of large fruit: as theſe trees do generally produce ſtronger ſhoots, ſo they require more water to be given them than the orange; but as to the tender ſorts, they muſt be treated with a little more care, otherwiſe their fruit will fall off in winter, and come to nothing. See ORANGE.

LEMONADE, a liquor prepared of water, ſugar, and lemon or citron-juice: it is very cooling and grateful.

LAMURIA, a feſtival of the ancient Romans, ſolemnized on the ninth of May, to pacify the manes of the dead, who were the lemures or phantoms that came in the night to torment the living.

LENITIVE MEDICINES, among phyſicians, thoſe of a mild, ſoftening, and relaxing nature, and deſtitute of all acrimony.

LENS, in dioptrics, a ſmall oblong glaſs like a lentil; it is a medium terminated on one ſide by a ſpherical ſurface, on the other by a ſurface either plain or ſpherical. And of theſe there are five ſorts. The firſt, as A (plate LXV. *fig.* 7.) is plain on one ſide, and convex on the other; the ſecond, B, convex on both ſides; the third plain on one ſide and concave on the other, as C; the fourth, D, concave on both ſides; the fifth convex on one ſide and concave on the other, as E, which is by ſome called a meniſcus.

The axis of a lens is a line paſſing perpendicularly through both its ſurfaces: thus the line F G is an axis common to all the five.

Lenſes are diſtinguiſhed into two general kinds, convex and concave: the firſt and ſecond lenſes are conſidered as convex; the third and fourth as concave: the laſt, if its convexity is greater than its concavity, is looked upon as convex; if on the contrary, it is conſidered as concave.

A lens is always ſuppoſed to conſiſt of a medium denſer than the circumambient one, unleſs where the contrary is expreſſed.

When parallel rays fall upon the ſurface of a con-

vex lens, they are refracted towards each other in paſſing through it, and thereby collected to a focus on the other ſide.

To explain this, let us trace the progreſs of a ray, as A B (*fig.* 8.) through the convex lens C D E H, whoſe axis is I K. Let L be the center of the firſt convexity C D E, and M that of the other C H E: and let this ray A B be parallel to the axis; through B draw the line L N, which will be perpendicular to the ſurface C D E at that point. The ray A B in entering the denſer ſubſtance of the lens will be refracted towards the perpendicular, and, therefore, proceed, after it has entered the ſurface at B, in ſome direction inclined towards the axis, as B P. Through M, the center of convexity of this ſurface, and the point P, draw the line M R, which paſſing through the center will be perpendicular to the ſurface at P, and the ray now entering a rarer medium, will be refracted from the perpendicular into ſome direction at P F. In like manner and for the ſame reaſons, the parallel ray S T on the other ſide the axis, and alſo all the intermediate ones, as X Z, &c. will meet in the ſame point, unleſs the rays A B and S T enter the ſurface of the lens at too great a diſtance from the axis I F, the reaſon of which has already been fully explained. See REFRACTION.

The point F, where the parallel rays A B, S F, &c. are ſuppoſed to be collected by paſſing through the lens C E, is called the focus of parallel rays of that lens.

If the rays converge before they enter the lens, they are then collected at a point nearer to the lens than the focus of parallel rays. If they diverge before they inter the lens, they are then collected in a point beyond F; unleſs they proceed from a point on the other ſide at the ſame diſtance with the focus of parellel rays, in which caſe they are rendered parallel. If they proceed from a point nearer than that, they diverge afterwards, but in a leſs degree than before they enter the lens.

If the lens is plain on one ſide and convex on the other, the rays are refracted the ſame way, but in a leſs degree.

Had the rays A B, S T, proceeded from a radiant point on one ſide the lens, and been collected in a focus on the other; then if they ſhould be ſuppoſed to proceed from that focal point as from a radiant, and paſs through the lens the contrary way, they would be collected in that point which was the radiant in the other caſe: and the nearer the radiant point is to the lens, the farther is the focus from it on the other ſide, and vice verſa.

If the rays A B, C D, E F, &c. (*fig.* 9.) be parallel to each other, but oblique to G H, the axis of the lens I K, or if the diverging rays C B, C F, proceed as from ſome point, C, which is not ſituated in the axis of the lens, they will be collected into ſome point, as L, not directly oppoſite to the radiant C, but nearly ſo: for the ray C D, which paſſes through M, the middle of the lens, and falls upon the ſurface of it with ſome obliquity, will itſelf ſuffer a refraction at D and N; but then it will be refracted the contrary way in one place to what it is in the other; and theſe refractions will be equal in degree, if the lens has an equal convexity on each ſide, as we may eaſily perceive, if we imagine N D to be a ray paſſing out of the lens both at N and D; for it is evident that the line N D has an equal inclination to each ſurface at both its extremities. Upon which account the difference between the ſituation of the point L and one directly oppoſite to C is ſo ſmall, that it is generally neglected; and the focus is ſuppoſed to be in that line, which a ray, that would paſs through the middle point of the lens, were it to ſuffer no refraction, would proceed in.

All which is ſufficiently clear, from what is ſaid under the article REFRACTION.

When parallel rays fall upon a concave lens, they are refracted from each other in paſſing through it, and thereby made to diverge, proceeding as from an imaginary focus on the firſt ſide of the lens.

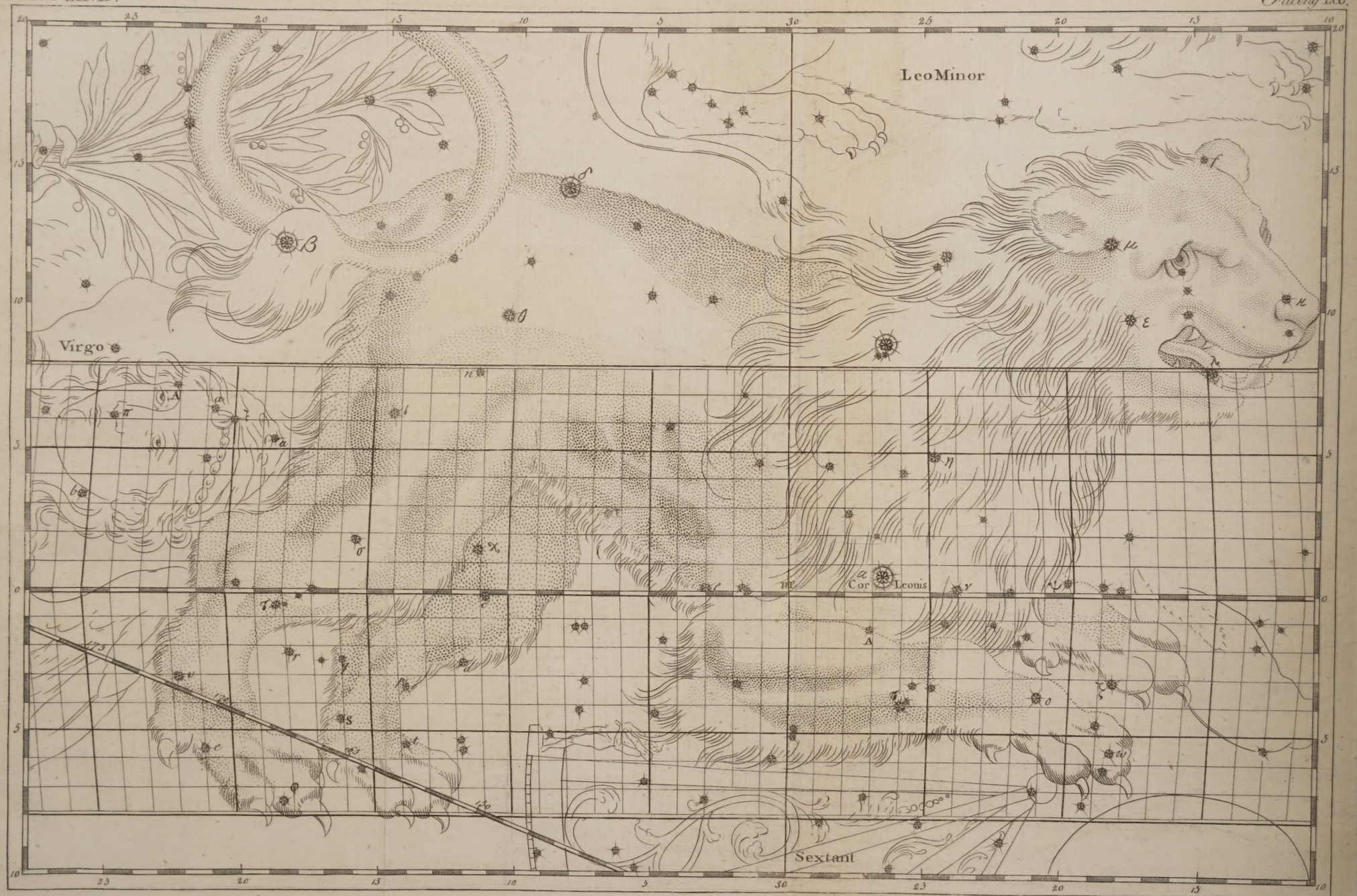
In order to comprehend this, let A B C D (plate LXVI. *fig.* 1.) repreſent a concave lens, E F its axis, G H the radius of the firſt concavity, I K that of the ſecond; produce G H to L, and let M G be a ray of light entering the lens at the point G. This ray, being refracted towards the perpendicular G L, will paſs on to ſome point, as K, in the other ſurface, more diſtant from the axis than G, and being there refracted from the perpendicular I K, will be diverted farther ſtill from the axis, and proceed in the direction K N as from ſome point at O on the firſt ſide of the lens. In like manner other rays, as P Q, parallel to the former, will proceed after refraction at both ſurfaces as from the ſame point O; which upon that account will be the imaginary focus of parallel rays of this lens.

If the rays diverge before they enter the lens, their imaginary focus is then nearer the lens than that of the parallel rays. If they converge before they enter the lens, proceeding towards ſome diſtant point in the axis at E, they are then rendered leſs converging; if they converge to a point at the ſame diſtance from the lens with the focus of parallel rays, they then go out parallel; if to a point at leſs diſtance, they remain converging, but in a leſs degree than before they entered the lens.

When the rays enter the lens diverging, the nearer their radiant point is to it, the nearer alſo is their imaginary focus after refraction, and vice verſa.

If the lens is plain on one ſide and concave on the other, the rays ſuffer a like refraction in each caſe, but in a leſs degree.

The



LEO

T. Lodge Sculp.

The truth of what has been ſaid, concerning the paſſage of rays through a concave lens, is eaſily deduced from the laws of refraction.

But the method of determining the exact focal diſtance of lenſes, is to be had from the propoſitions laid down and demonſtrated in the article REFRACTION, which ſee.

Thus the progreſs of the rays, after their refraction at the firſt ſurface where they enter a lens, is had by one of thoſe which determines the focal diſtance of rays entering a denſer medium of ſuch form: and their progreſs, after their refraction at the other ſurface where they go out, is had by computing what progreſs rays, moving in the direction they are found to have after their entrance at the firſt ſurface, will acquire by being refracted at the other; which is to be effected by one who determines the focal diſtance of rays paſſing out of a denſer medium of like form with that of the lens.

When a ray paſſes through a medium, terminated by two plain and parallel ſurfaces, it is refracted one way in going out of the ſecond, as much as it was the other in entering the firſt; and, therefore, proceeds afterwards, not in the ſame direction, but in one which is parallel to that which it had before.

Thus, if the ray A B *(fig.* 2.) enters the denſer medium C D E F terminated by the parallel ſurfaces C D and E F, it is refracted at B towards the perpendicular B I, proceeding to a point at G, where it is as much refracted from the perpendicular G K in going out, and proceeds in the direction G H, not the ſame, but parallel to the former A B L.

LENT, a ſolemn time of faſting in the Chriſtian church, obſerved as a time of humiliation before Eaſter, the great feſtival of our Saviour's reſurrection.

Thoſe of the Romiſh church, and ſome of the proteſtant communion, maintain, that it was always a faſt of forty days, and as ſuch, of apoſtolical inſtitution. Others think, it was only of eccleſiaſtical inſtitution, and that it was variouſly obſerved in different churches, and grew by degrees from a faſt of forty hours, to a faſt of forty days. This is the ſentiment of Morton, biſhop Taylor, du Moulin, Daillé, and others.

The Chriſtians of the Greek church obſerve four Lents; the firſt commences on the fifteenth of November, or forty days before Chriſtmas; the ſecond is the ſame with our Lent; the third begins the week after Whitſuntide, and continues till the feſtival of St. Peter and St. Paul; and the fourth commences on the firſt of Auguſt, and laſts no longer than till the fifteenth. Theſe Lents are obſerved with great ſtrictneſs and auſterity; but on Saturdays and Sundays they indulge themſelves in drinking wine and uſing oil, which are prohibited on other days.

LENTA FEBRIS, the ſlow fever. See the article FEVER.

LENTIGO, FRECKLES, in medicine. See the article FRECKLES.

LENTISCUS, the lentiſk or maſtich-tree, in botany, a genus of trees, very nearly allied to the terebinthus, or turpentine-tree, in its characters, but differing in that the leaves are pinnated; but there is no ſingle leaf to terminate the end of each compound one. See the article MASTICH.

LEO, the lion, in zoology. See LION.

LEO, in aſtronomy, one of the twelve ſigns of the zodiac, the fifth in order, containing, according to Ptolemy, thirty-two ſtars; according to Tycho, thirty-ſeven; and in Mr. Flamſtead's, ninety-four. The latitudes and longitudes of which are as follow. See plate LXVII.

Names and ſituations of the ſtars.	Sign ♌	Longitude.	Latitude.		Magnit.
		° ′ ″	° ′ ″		
That in the noſtrils — — — —		11.47.49	10.23.51	N	4
In the foremoſt toe of the ſouthern fore-foot ——		18. 3.18	5.35.27	S	5
		18.20. 7	6.24.22	S	6
In the aperture of the mouth — — —		14.22.34	7.51.27	N	4
In the third toe of the northern fore-foot ——		18.10. 5	3.11.22	S	4
5.					
Northern and following in the claw — — —		18.40.22	4.41.12	S	6
		18. 4.47	0. 1.52	N	6
		15.11.25	9.55.48	N	6
		20.50.24	6.59.47	S	5
		15.14.35	10.41. 9	N	78
10.					
		15.35.35	11.23.26	N	7
Following in ſouthern fore-foot — — — —		20.46.29	3.46.50	S	34
		14.34.53	15.21. 3	N	6
In the preceding knee — — — — —		20. 0.25	0.19. 3	N	6
Southern of three in the head — — —		17.12.37	9.41. 4	N	3
15.					

Mid-

Names and situations of the stars.	Sign	Longitude.	Latitude.		Magnit.
		° ′ ″	° ′ ″		
		21.20.49	1.33.23	S	6
		21.39.41	1.42.11	S	7
		18.57.53	7.32.58	N	6
		22.21.23	1. 9.33	S	7
Middle one of the head		18.17.56	10.45. 1	N	6
20.					
North, in the head		17.56.47	12.19.29	N	34
		24.39.53	3.25.39	S	7
		22.53.26	2.37.58	N	7
Juſt before the heart		23.51.13	0. 1.25	N	45
		25.14.33	3.51.45	S	79
25.					
In the following knee		25.39.25	3.56.18	S	4
South. of three in the neck		34.24.45	4.50.20	N	34
In the breaſt below the heart		26.55.37	1.26.15	S	5
The lion's heart, called Regulus		26.21.41	0.26.38	N	1
		25.34.21	4. 8.45	N	7
30.					
		26.36.31	2. 1.10	N	6
		24. 1.33	11.55.37	N	6
North. in the neck		24. 4. 2	11.50.13	N	3
		27.36.22	2.48. 7	N	6
		24.21.13	11.37.13	N	6
35.					
		26.12.46	8.26.51	N	6
Middle and ſubſeq. in the neck		26. 5.26	8.47.27	N	2
		28.19.44	4.24.54	N	6
	♍	1.37.31	3.20.14	S	6
		1.21. 0	1. 2.27	S	56
40.					
Preceding and leſſer		1.33. 6	0. 5. 8	N	6
Preceding of three in the belly		0.58.19	4.33.27	N	6
In the oxilla		2.54. 1	0. 7.48	N	4
		4.14.26	1.52.27	S	6
		3.39.46	0.16.10	S	7
45.					
Informis 40th of Urſa Maj. Tych.	♌	25.11.16	21.37. 1	N	3
	♍	1.43.51	7. 0.25	N	67
Foremoſt of two over the back	♌	28.39.35	16.49. 4	N	65
		29.59.36	13.56.46	N	5
In the middle of the back	♍	2.20.35	10.14.52	N	6
50.					
North. of three in the belly		4. 9.42	5.54.48	N	6
South. and ſubſeq. in the belly		6.11.40	2.47.40	N	6
Subſeq. over the back		2. 0.42	16.28.40	N	45
		11.24.53	5.39.57	S	65
		9.23.56	0.35.42	S	67
55.					
		11.38.58	5.54. 3	S	7
South. of three under the belly		11.25.55	2.31.51	S	5
Middle under the belly		10.30.54	0.13.16	S	5
Preceding in the loins		5.21.29	12.53.37	N	5
		14. 4. 1	8. 3. 1	S	5
60.					
		14.32.32	5.34.35	S	6
North. of three under the belly	♍	11. 2.30	1.20.21	N	45

Names and situations of the stars.	Sign	Longitude.	Latitude.		Mag.
		° ′ ″	° ′ ″		
		5.13.51	16.16.29	N	6
		13.34. 5	3.26. 1	S	6
		14.59.17	6.24. 8	S	6
65.					
A bright one following in the loins — —		4.55.17	17.35.54	N	6
		7.47.42	14.19. 4	N	23
South. in the hip — — — —		15.55. 0	4.38.53	S	56
North. in the hip — — — —		9.55.52	9.39.50	N	3
		9.16.55	11.35. 5	N	6
70.					
That over the bright one in the loins — —		6.58.34	16.46. 2	N	5
North. of two in the thigh — — —		11. 8.28	7.51.41	N	6
That before the hindermoſt claw — — —		18. 0.40	7.39. 5	S	4
		15.54. 0	2.22.53	S	6
		16.25.40	2. 33.21	S	7
75.					
In the ham — — — — —		15.12.46	1.40.53	N	45
South. in the thigh — — — —		14. 3.19	6. 5.10	N	4
		17.41.14	2.16.55	S	56
		16.48.18	0. 0.35	N	6
		12. 4.22	11.41.39	N	7
80.					
		17.17.43	0.18. 5	S	78
		17.44.18	0.32. 7	S	8
More ſouth. as in the leg — —		18.12. 3	0.34. 4	S	4
		13.24.31	11. 8. 9	N	6
North. in the nail of the hind-foot —		12.21.36	13.56.16	N	6
85.					
South. in the nail of the hind-foot — —		20.53.34	5.42.22	S	45
		14.19.48	10.23.53	N	6
		19.25.32	0.16. 9	N	6
		73.57. 2	12.53. 8	N	6
North. in the nail of the hind-foot —		21.33.13	3. 3.35	S	4
90.					
		13.22.42	17.38. 0	N	6
That over the tail — — — —		15.29.21	17.18. 9	N	4
In the extremity of the tail — — —		18. 9.35	12.16.51	N	12
That following the tail — — — —		19. 9.48	13.53.21	N	6

LEONINE VERSES, ſuch as rhyme at every hemiſtich, the middle ſyllable of each verſe correſponding to the laſt one.

LEONTICE, in botany, a genus of plants whoſe flower conſiſts of ſix oval acute petals, with ſix ſlender filaments topped with erect antheræ: the fruit is a large inflated berry, with one cell, containing a few globular ſeeds.

LEONTODON, in botany. See the article DANDELION.

LEONURUS, lion's-tail, in botany, a genus of plants whoſe flower is monopetalous and ringent, with four ſtamina, two of which are longer than the others: there is no pericarpium; but the ſeeds, which are oblong and angular, are contained in the bottom of the cup.

LEOPARD, a beaſt of prey, with the ſpots on the upper part of the body round, and the lower ones virgated. It is a very nimble, as well as fierce animal, ſo that ſcarce any thing eſcapes it.

Authors call the male purdus, and the female panthera.

LEOPARD'S BANE, doronicum, in botany. See the article *Leopard's* BANE.

LEPIDIUM, dittander, in botany, a genus of plants whoſe flower is detrapetalous and cruciform, with ſix ſubulated ſtamina: the fruit is a compreſſed ſpearſhaped pod, containing oblong ſeeds.

The common dittander, which grows wild in many places in England, has a very hot acrid taſte, like pepper; it is ſaid to incide groſs humours, opening obſtructions of the liver and ſpleen, and is accounted a great antiſcorbutic: when the leaves are eaten in the morning, faſting, they excite the appe-

tite and help digeſtion. Some affirm, that the powder of the dried leaves, given in wine to half an ounce, in a morning, faſting, is excellent in the dropſy.

LEPIDOPTERA, in zoology, an order of inſects, with four wings, which are covered with imbricated ſquamulæ: add to this, that the mouth is commonly ſpiral.

Under this order, are comprehended the butterflies and phalenæ, or moths.

LEPROSY, *Lepra*, in phyſic, a higher degree of cutaneous diſorder than an itch, the ſame with lepra arabum. See ITCH, IMPETIGO, and ELEPHANTIASIS.

The word is derived from the Greek λεπρα, ſignifying the ſame, and that from λεπις a ſcale.

There is a wide difference between the itch and leproſy, and that ulcerous diſorder in which white ſordid ulcers, ſeizing principally the muſcular parts, ſuch as the back, arms, thighs, &c. diſcharge a putrid ſanies, and ſometimes appearing in one limb, and ſometimes in another, often continue for many years. Large quantities of worms are alſo found lodged within theſe ulcers, ſo that they can hardly be extirpated.

The lepra and elephantiaſis are diſeaſes nearly alike.

The method for the cure of theſe and ſuch like malignant diſorders, is to diſcharge the maſs of corrupt, glutinous, acrid humours, by ſufficient bleeding and abſtinence, by purges both gentle and draſtic, and then by a proper regimen. But if the growing and refractory ſtate of the diſeaſe raiſes a ſuſpicion of malignity, there are no remedies more powerful, if the patient's ſtrength permit, than mercury, and its preparation. Some make an unguent of live mercury thoroughly extinguiſhed with pomatum, adding flowers of ſulphur and camphire, with which the joints, ancles, &c. are to be well rubbed. But others chooſe a better and ſafer method of uſing mercury internally; whilſt, by a previous preparation of the body, by alteratives, correctors, and evacuants, mercurius dulcis, with double the quantity of crabs-eyes, and diaphoretic antimony, is duly exhibited. This intention is alſo anſwered by mercurius ſolaris and jovialis, of which a few grains, with conſerve of roſes, may be exhibited every morning, drinking in bed, after it, a pint of ſome proper decoction. Each of theſe methods require a very temperate air, a ſpare diet, and abſtinence from pinguious or boiled fleſh and acids.

But if the patient be either an infant, or too old, both the ancients and moſt judicious of the moderns have greatly extolled preparations of milk, eſpecially aſſes milk, the whey of cows and goats milk, and milk mixed with water.

Whenever theſe exanthematous diſorders are ſupported by a ſcorbutic lues, or hypochondraic affection, a much greater advantage will be procured, when the milk diet is ſo managed as to alleviate the other diſorder with which they are complicated: for which purpoſe, the beſt way is the due uſe of medicinal waters, eſpecially thoſe of a temperate kind, impregnated with a ſaline and ſpirituous principle. But if ſuch waters cannot be had, the end will be beſt anſwered by a decoction of ſuch herbs as depurate the blood, and are particularly deſtined to theſe diſorders, with milk or whey, both ſweet and ſomewhat ſour. *Hoffman.*

LEPUS, the hare, in zoology. See HARE.

LEPUS, in aſtronomy, a conſtellation of the ſouthern hemiſphere; comprehending twelve ſtars, according to Ptolemy; thirteen, according to Tycho; and nineteen in the Britannic catalogue.

LESSONS, among eccleſiaſtical writers, portions of the Holy Scripture, read in Chriſtian churches at the time of divine ſervice.

LETHARGY, *Lethargus*, in phyſic, a kind of diſorder, wherein the perſon affected labours under a heavy and perpetual ſleep, with ſcarce any interval of waking.

The word is derived from the Greek ληθη, ſleep, and αργος, ſlothful.

There are ſeveral ſpecies of this diſorder; the chief are coma vigil, coma ſomnolentum, carus, and a lethargy. See COMA, CARUS, &c.

LETHE, in the ancient mythology, one of the rivers of hell, ſignifying oblivion or forgetfulneſs; its waters having, according to poetical fiction, the peculiar quality of making thoſe who drank them entirely forget every thing that was paſt.

LETTER, *Litera*, a character either in print or writing, which men have agreed on to ſignify ſomething, by joining of which they make their thoughts known to one another.

The alphabet of every language conſiſts of a certain number of letters or characters, which have a different ſound, form, and ſignification. See ALPHABET.

The articulation of words, or formation of the ſeveral letters, begins when the breath has paſſed the throat; and is almoſt performed by the noſtrils, mouth, tongue, and lips.

Some ſay that Fohi, firſt king among the Chineſe, and 2950 years before Chriſt, invented letters, having writ in that language a book called Yexim. Others think, from mummies and obeliſks, that hieroglyphics were the firſt manner of writing, they being prior to Moſes, as moſt of the obeliſks and pyramids were made while the Iſraelites were in Egypt. The Chaldeans or Phœnicians, it is very likely, were the maſters of the Egyptians; whence it was, that thoſe letters were called Phœnician by the Greeks: yet, according to Diodorus Siculus, they only changed the form of letters.

Pliny will have the moſt ancient letters to have been the Aſſyrian, and that Cadmus, about two hundred and fifty years before the Trojan war, brought

brought ſixteen of them from Phœnicia into Greece, namely, A, B, C, D, E, F, I, L, M, N, O, P, R, S, T, U, to which Palamedes, during the Trojan war, had added four, Θ, Ξ, Φ, Υ.

Simonides, Evander, and Demaratus, were the firſt that brought letters into Italy.

The Hebrews made a diviſion of their letters into guttural, viz. *a, h, ch, gn,* or *aleph, he, cheth, hain*; dental, as *z, ſ, r, zain, tſadde, reſh*; labial, *b, m, n, p, beth, mem, vau, phe*; and thoſe of the tongue, *d, t, l, n,* or *daleth, tau, lamed, nun*; and palatal, as *g, i, c, k, ghimel, jod, caph, coph.*

The letters F, G, H, K, Q, X, Y, Z, were formerly unknown to the Romans. One letter was intended to ſignify only one ſound, and not as at preſent, now to expreſs one ſound, and then another, which has introduced that confuſion which has rendered the learning of our modern tongue extremely difficult.

Grammarians diſtinguiſh their letters into vowels and conſonants; into mutes, diphthongs, liquids, and characteriſtics. Printers diſtinguiſh their letters into capital, majuſcule, initial, or upper-caſe letters, which ſerve for the titles of books, &c. and minuſcule, ſmall or lower-caſe letters, which are again divided into pearl, nonpareil, pica, and great canon.

Letters, again, are of various ſizes, each of which are ſometimes caſt with the Roman, ſometimes Italic, ſometimes an Engliſh, or black letter face. There are alſo bodies with the Greek, Hebrew, Arabic, the muſic face, &c.

A ſet or fount of any of theſe ſizes includes current letters, capitals, numeral figures, points, ſpaces, &c. See FOUNT.

Letters are the elements of grammar; an aſſemblage of theſe compoſes ſyllables, of thoſe words, and of theſe ſentences.

Numeral LETTERS, thoſe uſed inſtead of cyphers, in order to expreſs numbers, as C, D, I, L, M, V, X.

LETTER alſo denotes the ſame with epiſtle, a writing addreſſed to any perſon.

LETTER *of Attorney*, a writing authoriſing any perſon to do the ſame lawful act for another, as to give ſeizin of lands, receive debts, ſue a third perſon, &c.

LETTER *of Credit*, among merchants, is a letter wrote by a merchant or banker to his correſpondent abroad, requeſting him to credit the bearer as far as a certain ſum. See CREDIT.

LETTER *of Licence*, an inſtrument or writing granted by a perſon's creditors, allowing him a certain time for the payment of his debts; by which means, he is enabled to proſecute his buſineſs, without fearing an arreſt.

LETTER *of Mart*, or *Marque*, a letter granted to one of the king's ſubjects, under the privy ſeal, impowering him to make repriſals for what was formerly taken from him by the ſubjects of another ſtate, contrary to the law of mart. See MARQUE.

Monitory LETTERS. See MONITORY.

LETTERS-PATENT, or OVERT, are writings ſealed with the great ſeal of England, ſo called, becauſe they are open with the ſeal affixed to them. Theſe are granted to authoriſe a man to do, or enjoy, what of himſelf he could not do. See the article PATENT.

Pacific LETTERS, *Literæ Pacificæ*, in church hiſtory, teſtimonial letters given by the biſhop, or chorepiſcopus, to their prieſts, when they had occaſion to travel abroad, certifying that the bearer was a catholic, and in communion with the church.

Paſchal LETTER, a letter written by the pope to all metropolitans, to inform them on what day Eaſter was to be celebrated.

LETTUCE, *Lactuca*, in botany, a well known genus of plants, the flower of which is compound and imbricated, containing a number of hermaphrodite corollulæ, which are monopetalous, ligulated, and truncated, and indented at the end in four or five parts: the ſeeds are oblong, acuminated, and crowned with down, and placed in the cup.

There are ſeveral ſorts of lettuce cultivated in gardens for culinary purpoſes, as the cabbage-lettuce, brown Dutch, imperial, white cos, black cos, green cos, &c. They are all ſown at different ſeaſons of the year, whereby there is a continual ſupply; but the moſt eſteemed ſort is the cos: theſe ſhould be protected in winter with glaſſes, otherwiſe they are liable to be deſtroyed in very wet or froſty weather. In March they may be tranſplanted in the open ground, where they may remain till they are cabbaged, and then they are fit for uſe; but if they are not inclinable to turn in, they ſhould be tied round their tops with baſs, &c. which will blanch and make them tender.

Lettuces, in general, are eaſy of digeſtion, they abate the acrimony of the humours, and quench thirſt; for which reaſon they are frequently uſed in ſummer ſeaſon: many take them to be anodyne, and to procure ſleep, which is done, not by any narcotic quality, but by relaxing the fibres and temperating the heat of the viſcera; they are good in dry conſtitutions, and help thoſe that are coſtive.

LEVARI FACIAS, is a writ directed to the ſheriff for levying a certain ſum of money upon the lands, &c. of a perſon who has forfeited his recognizance.

LEVATOR, in anatomy, a name applied to ſeveral muſcles in the body, that ſerve to raiſe the parts to which they belong. See ELEVATOR.

LEVATOR *ſcapulæ proprius*, in anatomy, or rather, according to Winſlow, *angularis*, is a long, and pretty thick muſcle, about two fingers in breadth, lying above the ſuperior angle of the ſcapula, along the poſterior lateral part of the neck of that bone. It is inſerted above in the tranſverſe apophyſes

pophyſes of the four firſt vertebra of the neck, by four fleſhy branches ending in ſhort tendons. From thence theſe branches run down a little obliquely, and then uniting are inſerted into the ſuperior angle of the ſcapula and in the edge of its baſis, and from thence to the ſmall triangular ſpace, being there covered a little by the rhomboides: it is alſo covered by the trapezius. By its inſertion in the ſuperior angle of the ſcapula, it moderates the deſcent of that angle, while the trapezius and ſerratus major raiſe the acromium. Afterwards, when theſe two muſcles ceaſe to act, the angularis raiſes the ſuperior angle, and by that means depreſſes the acromium.

LEVATORES *Ani*, in anatomy, are muſcles that ariſe fleſhy from each ſide of the oſſa pubis, internally within the pelvis, as alſo from part of the os iſchium and ſacrum; from thoſe places, like lines drawn from a circumference towards a center, its fibres deſcend, over the muſculi marſupiales, to their implantation at the lower end of the inteſtinum rectum in the anus. They chiefly ſerve to ſuſpend and draw the anus upwards, leſt the fæces ſhould be burdenſome to the ſphincter. In their deſcent, on each ſide forwards, from the oſſa pubis, they paſs cloſe over the glandulæ proſtatæ, in a manner embracing them, whereby they are rendered capable of compreſſing them; and by a retraction of the anus, at the ſame time act on the veſiculæ ſeminalis, in order to promote the emiſſion of the ſemen in coitu. *Cowper*.

LEUCADENDRON, in botany, a genus of plants, the general corolla of which is uniform and convex; the partial one of which is oblong, hoary on the outſide, and compoſed of two petals; the upper petal is a long line or unguis, and its limb is lanceolated, undivided, and in its lower part is firmly joined to the lower petal; the lower petal has alſo a long unguis of a linear figure, but three times as broad as that of the upper petal; the cup, ſcarce at all altered, ſerves inſtead of a pericarpium, and contains a ſingle roundiſh ſeed, coronated with hairs.

LEUCOIUM, in botany, a genus of plants whoſe flower is ſpreading, and divided into ſix oval petals, joining at their baſe: the ſtamina are ſix very ſhort briſtly filaments, topped with oblong quadrangular antheræ: the fruit is a turbinated capſule, formed of three valves, with three cells, which are filled with roundiſh ſeeds.

LEVEL, an inſtrument to draw a line parallel to the horizon, whereby the difference of aſcent or deſcent between ſeveral places may be found, for conveying water, draining fens, &c.

The word is derived from the Latin, *libella*, the croſs beam in a balance, which, to be juſt, muſt ſtand exactly horizontal.

Air LEVEL, that which ſhews the line of level by means of a bubble of air incloſed with ſome liquor in a glaſs tube, whoſe two edges are ſealed hermetically. When the bubble fixes at a mark made exactly in the middle of the tube, the plane where it is fixed is level; otherwiſe the bubble will riſe to one end.

The liquor with which the tube is filled is of oil of tartar, or aqua-ſecunda; theſe not being liable to freeze.

Air LEVEL, with ſights, conſiſts of an air level about eight inches long, and ſeven or eight in diameter, ſet in a braſs tube, with an aperture in the middle. The tubes are carried in a ſtrong ſtraight ruler, a foot long, at whoſe ends are fixed two ſights exactly perpendicular to the tubes, and of an equal height, having a ſquare hole, formed by two fillets of braſs, croſſing each other at right angles, in the middle of which is drilled a very little hole, through which a point on a level with the inſtrument is deſcribed.

The braſs tube is faſtened on the ruler by means of two ſcrews; one of which ſerves to raiſe or depreſs the tube at pleaſure, to bring it to a level. The top of the ball and ſocket is rivetted to a little ruler that ſprings, one end of which is faſtened with ſcrews to the great ruler, and the other end has a ſcrew ſerving to raiſe or depreſs the inſtrument when nearly level.

The following is a more commodious inſtrument.

Air LEVEL, with teleſcope ſights; this level only differs from the laſt, in that, inſtead of plain ſights, it carries a teleſcope.

This was invented by M. Huygens; which has this advantage, that it may be inverted by turning the rule and teleſcope half round; and then, if the hair cut the ſame point that it did before the turn, it is a proof that the operation is juſt.

It may be obſerved, that one may add a teleſcope to any kind of level, by applying upon a parallel to the baſe or ruler, when there is occaſion to take the level of remote objects.

Artillery-Foot LEVEL, in gunnery, is in form of a ſquare, having its two legs or branches of an equal length, at a juncture whereof is a little hole, whence hangs a thread and plummet, playing on a perpendicular line in the middle of a quadrant. It is divided into twice 45 degrees from the middle.

This inſtrument may be uſed on other occaſions, by placing the ends of its two branches on a plane; for when the thread plays perpendicularly over the middle diviſion of the quadrant, that plane is aſſuredly level. To uſe it in gunnery, place the two ends on the piece of artillery, which you may raiſe to any propoſed height, by means of the plummet, whoſe thread will give the degree above the level.

Carpenter's and Paviour's LEVEL, conſiſts of a long ruler, in the middle whereof is fitted, at right angles, another ſomewhat bigger, at the top of which is faſtened a line, which, when it hands over a fiducial line at right angles with the baſe, ſhews that

that the ſaid baſe is horizontal. Sometimes this level is all of one board.

Gunner's LEVEL, for levelling cannons and mortars, conſiſts of a triangular braſs-plate, about four inches high, at the bottom of which is a portion of a circle, divided into 45 degrees, which number is ſufficient for the higheſt elevation of cannons and mortars, and for giving ſhot the greateſt range: on the center of this ſegment of a circle is ſcrewed a piece of braſs, by means of which it may be fixed or ſcrewed at pleaſure; the end of this piece of braſs is made ſo as to ſerve for a plummet and index, in order to ſhew the different degrees of elevation of pieces of artillery. This inſtrument has alſo a braſs-foot, to ſet upon cannons or mortars, ſo that when theſe pieces are horizontal, the inſtrument will be perpendicular. The foot of this inſtrument is to be placed on the piece to be elevated, in ſuch a manner, as that the point of the plummet may fall on the proper degree: this is what they call levelling the piece.

Maſon's LEVEL, is compoſed of three rules, ſo joined as to form an iſoſceles-rectangle, ſomewhat like a Roman A, at the vertex whereof is faſtened a thread, from which hangs a plummet, that paſſes over a fiducial line, marked in the middle of the baſe, when the thing, to which the level is applied, is horizontal: but declines from the mark, when the thing is lower on one ſide than on the other.

Plumb or *Pendulum* LEVEL, that which ſhews the horizontal lines by means of another line perpendicular to that deſcribed by a plummet or pendulum. This inſtrument conſiſts of two legs or branches, joined together at right angles, whereof that which carries the thread and plummet is about a foot and a half long; the thread is hung towards the top of the branch, at the point; the middle of the branch where the thread paſſes is hollow, ſo that it may hang free every where; but towards the bottom, where there is a little blade of ſilver, whereon is drawn a line perpendicular to the teleſcope, the ſaid cavity is covered by two pieces of braſs, making as it were a kind of caſe, leſt the wind ſhould agitate the thread, for which reaſon the ſilver-blade is covered with a glaſs, that it may be ſeen when the thread and plummet play upon the perpendicular: the teleſcope is faſtened to the other branch of the inſtrument, and is about two feet long; having an hair placed horizontally acroſs the focus of the object-glaſs, which determines the point of the level. The teleſcope muſt be fitted at right-angles to the perpendicular. It has a ball and ſocket by which it is faſtened to the foot, and was invented by Mr. Picard.

Reflecting LEVEL, that made by means of a pretty long ſurface of water, repreſenting the ſame object inverted which we ſee erected by the eye, ſo that the point where theſe two objects appear to meet, is a level with the place where the ſurface of water is found. This is the invention of Mr. Mariotte.

There is another reflecting level, conſiſting of a mirror of ſteel, or the like, well poliſhed, and placed a little before the object-glaſs of a teleſcope, ſuſpended perpendicularly. This mirror muſt make an angle of 45° with the teleſcope, in which caſe the perpendicular line of the ſaid teleſcope is converted into a horizontal line, which is the ſame with the line of level. This is the invention of M. Caſſini.

Water-LEVEL, that which ſhews the horizontal line by means of a ſurface of water or other liquor, founded on this principle, that water always places itſelf level. See the article FLUID.

The moſt ſimple is made of a long wooden trough, or canal, whoſe ſides are parallel to the baſe, ſo that being equally filled with water, its ſurface ſhews the line of level.

It is alſo made with two cups fitted to the two ends of a pipe, three or four feet long, about an inch in diameter, by means whereof the water communicates from the one to the other cup; and this pipe being moveable on its ſtand by means of a ball and ſocket, when the two cups become equally full of water, their two ſurfaces mark the line of level.

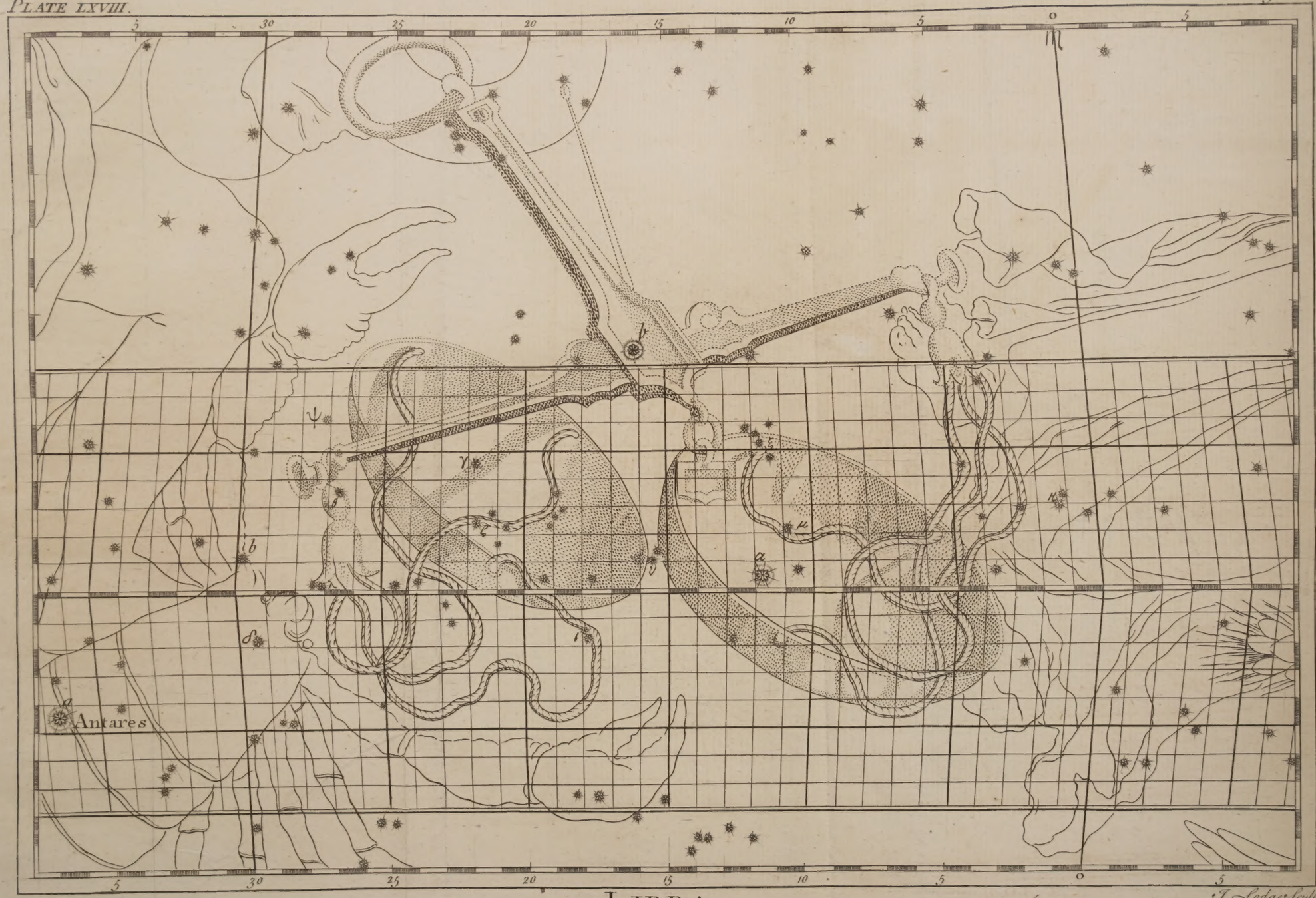
This inſtrument, inſtead of cups, may alſo be made with two ſhort cylinders of glaſs three or four inches long, faſtened to each extreme of the pipe with wax or maſtic. Into the pipe is poured ſome common or coloured water, which ſhews itſelf through the cylinders, by means whereof the line of level is determined; the height of the water, with reſpect to the center of the earth, being always the ſame in both cylinders: this level, though very ſimple, is yet very commodious for levelling ſmall diſtances.

LEVELLING, the finding a line parallel to the horizon, at one or more ſtations, and ſo to determine the height of one place with regard to another. See LEVEL.

A truly level ſurface is a ſegment of any ſpherical ſurface which is concentric to the globe of the earth. A true line of level is an arch of a great circle which is imagined to be deſcribed upon a truly level ſurface.

The apparent level is a ſtraight line drawn tangent to an arch or line of true level. Every point of the apparent level, except the point of contact, is higher than the true level.

When a proper ſtation for the level has been pitched upon between the two points, the two heights obſerved at that ſtation muſt be written down in two columns, namely, under the firſt column thoſe obſerved when the eye was from the ſpring, or towards the point, which may be called



LIBRA.

J. Lodge Sculp.

LIBATION, a religious ceremony among the ancient pagans, which conſiſted in an effuſion of liquors poured on the head of the victims prepared for ſacrifice.

Libations were alſo in uſe among the Hebrews, who poured a tun of wine on the victim after it was killed, and the ſeveral pieces of the ſacrifice were laid on the altar, ready to be conſumed in the flames.

LIBEL, injurious reproaches or accuſations againſt a perſon, written and publiſhed in order to expoſe him to public contempt, hatred, or ridicule.

LIBEL, in the law of Scotland, implies an indictment. See INDICTMENT.

LIBELLA, or LIBELLULA, in the hiſtory of inſects, a genus of four-winged flies, called in Engliſh dragon-flies, or adder-flies; the characters of which are, that they are furniſhed with jaws, the antennæ are ſhort, and the tail terminated by a kind of forceps.

LIBERATE, in law, a writ that lies for the payment of a penſion, or annual ſum, granted under the great ſeal, being directed to the treaſurer and chamberlains of the exchequer.

LIBERIA, in Roman antiquity, a feſtival obſerved on the ſixteenth of the calends of April, at which time the youth laid aſide their juvenile habit, for the toga virilis, or habit peculiar to grown men. See the articles TOGA.

LIBERTUS, in Roman antiquity, a perſon who from being a ſlave had obtained his freedom. See MANUMISSION.

LIBERTY, *Libertas*, in general, denotes a ſtate of freedom, in contradiſtinction to ſlavery. See the article FREEDOM.

According to Cicero, liberty is the power of living as a man pleaſes, or without being controlled by another.

In a legal ſenſe, liberty ſignifies ſome privilege that is held by charter or preſcription.

LIBRA, the ballance, in aſtronomy, one of the twelve ſigns of the zodiac, the ſixth in order; ſo called becauſe, when the ſun enters it, the days and nights are equal, as if weighed in a ballance.

LIBRA, in Roman antiquity, a pound weight; alſo a coin, equal in value to twenty denarii.

LIBRARY, an edifice, or apartment, deſtined for the placing of books; or the books themſelves lodged therein.

The word is formed from the Latin *libraria*, which is derived from *liber*, a book.

LIBRATION, in aſtronomy, an apparent inequality in the motion of the moon, by which ſhe ſeems to librate or waver about her own axis, ſometimes from the eaſt to the weſt, and ſometimes from weſt to eaſt. See the article MOON.

LIBRATION *of the Earth* is that motion whereby the earth is ſo retained in its orbit, that its axis continues conſtantly parallel to the axis of the world.

LICENCE, in law, an authority given to a perſon to do ſome lawful act.

LICENTIATE, one who has obtained the degree of a licence.

LICHEN, *Cinereus Terreſtris*, aſh-coloured ground liver-wort, in botany, a ſpecies of moſs, conſiſting of roundiſh, pretty thick leaves, divided about the edges into obtuſe ſegments, flat above, of a reticular texture underneath, faſtened to the earth by ſmall fibres; when in perfection, of an aſh-grey colour; by age, turning darker-coloured or reddiſh. It grows on commons and open heaths, ſpreads quickly on the ground, and is to be met with at all times of the year, but is ſuppoſed to be in its greateſt vigour about the end of autumn.

This herb is ſaid to be a warm diuretic. It is particularly celebrated as a preſervative againſt the terrible conſequences of the bite of a mad dog: an account of the remarkable efficacy, in this intention, of a powder compoſed of the dry leaves and black pepper, was communicated to the Royal Society by Mr. Dampier, and publiſhed in N°. 237 of the Philoſophical Tranſactions. This powder was afterwards inſerted, in the year 1721, into the London Pharmacopœia, at the deſire of Dr. Mead, who had large experience of its good effects, and who declares, that he had never known it to fail, where it had been uſed, with the aſſiſtance of cold bathing, before the hydrophobia began.

LICTORS, *Lictores*, in Roman antiquity, the ſerjeants or beadles who carried the faſces before the ſuperior magiſtrates: it was alſo a part of their office to be the public executioners in beheading, ſcourging, &c.

LIEGE, in law, a term ſometimes uſed for liege-lord, or one who owns no ſuperior; and ſometimes for liege-man, or one who owes allegiance to the liege-lord. In our ſtatutes, the king's ſubjects are ſometimes called lieges, or liege-people.

LIEN, the ſpleen, in anatomy. See SPLEEN.

LIENTERY, in medicine, a diſorder proceeding from a preternatural ſmoothneſs of the inteſtines, in conſequence of which, what is diſcharged by ſtool, greatly reſembles the aliments, both in colour and ſubſtance.

The cauſe of this diſorder, according to Fernelius, is not an obſtructed or hindered diſtribution of the aliments, but a weakneſs of the firſt concoction, in conſequence of which the aliments paſs through the inteſtines unchanged.

The principal intention of cure in a lientery, according to Etmuller, is to ſtrengthen and corroborate the ſtomach; which end is moſt effectually obtained by rhubarb, preparations of coral, and quinces. All the medicines recommended againſt vomiting, are alſo proper in this diſorder. Wald-

ſchmidius informs us, that the moſt ſimple and eaſily prepared ſtomachics are more beneficial in a lientery, than thoſe of the compound kind. The moſt proper ſtomachics, according to that author, are preſerved nutmeg, preſerved ginger, the white of an egg boiled with vinegar, and wormwood-wine prepared with maſtich.

LIEUTENANT, an officer who ſupplies the place, and diſcharges the office of a ſuperior in his abſence. Of theſe, ſome are civil, as the lords-lieutenants of kingdoms, and the lord-lieutenants of counties; and others are military, as the lieutenant-general, lieutenant-general of the artillery, lieutenant-colonel, lieutenant of the Tower, lieutenant of horſe, foot, ſhips of war, &c.

LIFE, *Vita*, in general, a kind of active operative exiſtence, and conceived to conſiſt in motion.

LIFE is uſed in a more particular ſenſe to ſignify the duration of an animal's being; or the ſpace of time that paſſes between its birth and death.

LIFE-ANNUITIES. See the article INTEREST.

LIFTS, in the ſea-language, certain ropes that reach from the maſt-heads to the yard-arms of a ſhip, to keep the ſail-yards parallel to the deck, or as ſeamen term it, ſquare by the lifts, i. e. parallel to the horizon, when the ſhip is upright, or at right angles with the maſt.

The lifts are alſo employed to top the yards, i. e. to lift one yard-arm higher than the other, by drawing in one lift, and ſlackening the other.

Topping-LIFT. See TOPPING-*Lift*.

LIGAMENT, in anatomy, a ſtrong compact ſubſtance, ſerving to join two bones together.

A ligament is more flexible than a cartilage, not eaſily ruptured or torn, and does not yield, or at leaſt very little, when pulled.

LIGATURE, in ſurgery, is a cord, band, or ſtring; or the binding any part of the body with a cord, band, fillet, &c. whether of leather, linen, &c.

Ligatures are uſed to extend and replace bones that are broken or diſlocated; to tie the patients down in lithotomy and amputations; to tie upon the veins in phlebotomy, or the arteries in amputations, or in large wounds; to ſecure the ſplints that are applied to fractures; to tie up the proceſſes of the peritonæum, with the ſpermatic veſſels in caſtration; and laſtly, in taking off warts or other excreſcences by ligature. For the manner of uſing them, ſee LITHOTOMY, FRACTURE, &c.

LIGHT, *Lux*, in philoſophy, certain inconceiveable ſmall particles of matter of different magnitudes, which are emitted or reflected from every point in the ſurface of a luminous body in right lines, and in all directions, with an unparalleled velocity, and whoſe power and intenſity decreaſe as the ſquares of the diſtances increaſe.

The Greeks, and after them all the barbarous nations, who learned of them to reaſon and to err, have ſaid from age to age through a long ſeries of time, "Light is an accident, which accident is the act of tranſparent as tranſparent; colours are what move tranſparent bodies. Luminous and coloured bodies have qualities like thoſe they excite in us, according to the maxim, that nothing can give what it has not. In fine, light and colours are a mixture of the hot, cold, dry, and humid; for the humid, dry, cold, and hot, being the principles of all things, colours muſt neceſſarily be compoſed of them." See the article COLOUR.

This is the abſurd jargon which the profeſſors of ignorance, paid by the public, have made human credulity revere ſo many ages; which manner of reaſoning prevailed almoſt in all things down to the time of Galileo and Deſcartes. Even long after them, the ſame traſh, the diſgrace of human underſtanding, ſubſiſted in many ſchools.

All the pretended philoſophers therefore having gueſſed at nature at a venture through the veil under which ſhe lay concealed, Deſcartes at length came, and diſcovered a corner of this great veil. He ſaid, "Light is a fine and ſubtile matter, diffuſed univerſally, that ſtrikes our eyes. Colours are ſenſations excited in us by God, according to the motions which tranſmit that matter to our organs." Thus far Deſcartes was in the right, and ought either to have ſtopped there, or, in advancing, to have taken experiment for his guide. But he was poſſeſſed with a deſire of eſtabliſhing a ſyſtem. That paſſion had the ſame effect on this great man, as paſſions have on all men; they hurry them beyond their principles.

According to Deſcartes, the light does not proceed to our eyes from the ſun, but in a globulous matter diffuſed univerſally, which the ſun impels, and which preſſes upon our eyes as a ſtaff puſhed at one end preſſes the ſame inſtant upon another. This appeared plauſible, but is not therefore the leſs falſe. Deſcartes, however, was ſo fully convinced of this principle, that, in his ſeventeenth letter of the third volume, he poſitively ſays, and repeats it, "I confeſs that I know nothing of philoſophy, if the light of the ſun is not tranſmitted to our eyes in an inſtant." And indeed we muſt own, that, as great a genius as he was, he knew very little of true philoſophy, and wanted the experiments of the preceding age. That age is as much ſuperior to Deſcartes, as Deſcartes was to antiquity.

If light were always diffuſed, and always exiſting in the air, we ſhould ſee as clearly in the night as we do in the day; becauſe the ſun below the horizon would continually impel the globules on all ſides, and the impreſſion equally affect our eyes.

That light is a material ſubſtance, and what we properly call body, is not to be doubted; becauſe we

we find it ſomething that has motion, or is propagated in time; ſomething that acts upon our bodies, and produces great alterations and changes in their natures and forms. It is ſomething that bodies act upon, by reflecting, inflecting, and refracting it on their ſurfaces, and in their pores: and it would appear to have weight, and all other ſenſible qualities of common matter, were it not that the ſmallneſs of its quantity renders them entirely imperceptible to us. Nor are we to conſider light only as a body, but as the moſt active principle or moſt general agent in nature; and it is, perhaps, the true primum mobile, or the ſpring of motion and action in all other bodies. Were the particles of light to be annihilated, we ſhould ſee no marks or foot-ſteps of fire or heat remaining, and therefore no power of motion in bodies; but all things would put on the appearance of lifeleſs inert matter, rigid and inflexible, as it would be abſolutely cold and dark.

The divine wiſdom and providence appear, perhaps, in nothing ſo remarkably as in the extreme ſubtilty of the particles of light: without this qualification it could not have pervaded the pores of bodies, and ſo we could have had none of thoſe which we call diaphanous or tranſparent ſubſtances, and every thing but the ſurface of a body would have been concealed from the ſight of mankind. Again, the velocity of a body is always as the quantity of matter inverſely; and therefore, the ſmaller the body, the greater velocity it is ſuſceptible of from the ſame force; whence it comes to paſs that light is thus qualified to be tranſmitted through immenſe diſtances in a ſmall and inſenſible part of time; which thing was quite neceſſary, according to the preſent frame and ſtate of nature.

But laſtly, it was abſolutely neceſſary that the particles of light ſhould be ſo exceeding ſmall, that, when compounded with its velocity, it ſhould produce no ſenſible force, as it muſt otherwiſe have done, and which, therefore, could not have been borne by the tender and delicate tecture of the ſeveral parts of vegetable and animal bodies. To give an example: the velocity of a particle of light is found to be at the rate of 897600000 feet per ſecond; ſuppoſe its matter to be but one millionth part of a grain, then its force to ſtrike an object would be as $\frac{897600000}{1000000} = 897{,}6$ feet per ſecond for one grain; or it would ſtrike with the ſame force that one grain weight would do falling from half the height, viz. through 448,8 feet; which we ſhould find to be very great, was the experiment to be made on the ſenſible coats of the eye.

Since the weight of bodies is proportioned to the quantity of matter, it follows, that where the latter is diminiſhed indefinitely, the former will be ſo too; therefore, the weight of light muſt be inſenſible to ever ſo great a quantity of it. Dr. Boerhaave cauſed a globe of iron, twelve inches in diameter, to be heated red hot, and ſuſpended at the end of a very exact balance, and counterpoiſed by weights at the other end very nicely, and thus let it hang till all the particles of heat or light were eſcaped, when he found the equilibre of the balance no ways altered; which plainly proves the above theſis.

That the particles of light have not only magnitude, but that in different degrees alſo, is another, and perhaps the moſt ſubtile, diſcovery of the Newtonion philoſophy. The comparative terms of greater and leſſer are now as applicable to the particles of light, as to any other bodies. This is abſolutely proved by the different refrangibility they are found to have in paſſing through a priſmatic figure of glaſs or water; for the power of the priſm detains the iſſuing particle, and draws it a little towards the ſurface; and, ſince this power is the ſame, it would have the ſame effect on all the particles of light, if they were all of an equal magnitude, becauſe they have all an equal velocity. But ſince this effect is different among the particles, ſome being detained and drawn aſide to a greater diſtance than others, it follows, they muſt be leſs in magnitude, to become more ſubject to the influence of the attracting ſurface; in like manner as the electric effluvia will act upon and agitate very ſmall and light bodies, much ſooner and more eaſily than they can move thoſe which are larger.

If light were not reflected from every point in the ſurface of a body in all directions every way, there might be aſſigned a point of ſpace where a ray of light, from ſuch a point in the ſurface, does not come; and there the ſaid point of the ſurface could not be viſible: but becauſe the eye can find no point of ſpace in all the viſible hemiſphere reſpecting that point, but where it is viſible; therefore, a ray of light is reflected from that point to every part of ſpace, from whence a right line to that point can be drawn.

That the rays of light proceed in a right-lined direction, is evident from hence, that whatever the figure of the body be, if it be held perpendicular to the rays of light, it will always caſt a ſhadow of the ſame figure againſt a parallel plane. Thus a circle will produce a circular ſhadow, a triangle a triangular one, and ſo on; which plainly ſhews that the rays of light paſs by the extremities of theſe bodies in right-lined directions, excepting theſe only which paſs contiguous to the edges of the body; for they will be a little inflected, which will cauſe the extremity of the ſhadow to be not ſo diſtinct and well defined as it otherwiſe would be; of which we ſhall take farther notice hereafter.

As all the other affections of light, ſo that of its velocity was utterly unknown to all the ancient, and moſt of the modern philoſophers, who, before the time of Mr. Romer, were of opinion that the motion of light was inſtantaneous, or that it was propagated through immenſe ſpaces in an inſtant. But Mr. Romer, and other philoſophers about this time,

making frequent obſervations on the eclipſes of Jupiter's moons, found that the time of theſe eclipſes did not correſpond to the calculations founded upon the aſtronomical tables; where the times are all calculated for the diſtance of the center of the ſun, and conſequently where the eye of the ſpectator muſt be ſuppoſed to be in viewing the ſaid eclipſes, occultations, &c. of Jupiter's moons.

But this, though a ſufficient diſcovery or proof of the progreſſive motion of light, was yet but an experiment in the groſs, and not accurate to determine or define the true rate or velocity which properly belonged to light: the ſolution of this noble problem was reſerved for Dr. Bradley, who by reiterated and certain experiments, obſerved, that the bright ſtar in the head of Draco, appeared 39″ more northerly in September than in March, juſt the contrary way to what it ought to appear by the annual parallax of the ſtars, which muſt ariſe from the velocity of light bearing ſome proportion to that of the annual motion of the earth. See the article ABERRATION *of the Stars*.

And hence it has been found, that the velocity of light is 10210 times greater than the velocity of the earth in her orbit. But the velocity of the earth is known, which is about 500,000,000 miles in 365 days, or about 56,000 miles per hour; whence the velocity of light will be found to be ſuch as carries it through the ſpace of 170,000 miles (or 897,600,000 feet) in one ſecond; and, therefore, it will paſs from the ſun to us in 8′ and 13″.

If a cannon will throw a ball one mile perpendicular height, or 5280 feet, the velocity with which it goes from the cannon's moth is the uniform velocity of 10,560 feet per $18\frac{1}{4}''$, which is the time of the perpendicular aſcent or deſcent, and therefore the velocity of the cannon-ball is 578 feet per ſecond. Whence the velocity of light is, to that of the cannon-ball, as 897,600,000 to 578, or as 1,550,000 to 1, nearly.

The doctor found, that the parallax of the fixed ſtars, inſtead of amounting to many ſeconds, as ſome have deduced from their obſervations, does not make one ſecond; and from thence it follows, that the above-mentioned ſtar, in Draco, is about 400,000 times farther from us than the ſun; and, conſequently, that the light takes up above 493″ × 400,000 = 197,200,000 ſeconds, which is more than ſix years, in coming from that ſtar to us.

For the properties of reflected and refracted light, ſee the articles REFLECTION and REFRACTION.

LIGHT is alſo uſed to denote the diſpoſition of objects, with regard to the receiving of light: thus, the doors, windows, &c. of houſes, are called lights.

For the lights and ſhades of painting, &c. ſee CLARO-OBSCURO.

LIGHTER, a ſort of veſſel or large boat employed in harbours or rivers, particularly the Thames, to bring goods to and from a ſhip in the act of lading and delivering the cargo. See CARGO.

LIGHT-HOUSE, among ſailors, a little houſe erected on a cape, hill, or promontory, near the ſea-coaſt, for the direction of ſhips which are paſſing that way: for this purpoſe it is furniſhed with great lights at the top, and has always ſomebody to watch them. As the lights may be ſeen at a great diſtance, they are very ſerviceable in guiding ſhips which are at a loſs to know where they are.

LIGHTNESS, or *Levity of* BODIES. See the article LEVITY.

LIGHTNING, in phyſiology, the burſting of fire from a cloud.

From Mr. Franklin's experiments, it appears, that lightning is only electrical fire drawn off from the clouds; and, in effect, this electricity has been collected, during thunder, in iron bars, or on tin tubes, in many parts of Europe. See ELECTRICITY.

Thunder, then, or lightning, is, in the hand of nature, what electricity is in ours; the wonders which we now exhibit at pleaſure, are only little imitations of thoſe great effects which frighten us. A cloud prepared by the action of winds, by heat, by a mixture of exhalations, &c. is the electrified body; and watery clouds, or terreſtrial matter, the non-electrics which excite it. See the article THUNDER.

LIGULATED, among botaniſts, an appellation given to ſuch floſcules as have a ſtraight end, turned downwards, with three indentures, but not divided into ſegments.

LIGUSTICUM, lovage, in botany, a genus of plants, the general corolla of which is uniform, and the ſingle flowers conſiſt each of five lanceolated petals, bent inwards at the points: the fruit is naked, oblong, angulated, ſulcated, and ſeparable into two parts; and containing two oblong, ſmooth ſeeds, plane on one ſide, and ſtriated on the other.

LIGUSTRUM, privet, in botany, a genus of trees, with a funnel-faſhioned flower, quadrifid or quinquifid at the limb: the fruit is a globoſe ſmooth berry, with only one cell, containing four ſeeds, convex on one ſide, and angulated on the other.

LILAC, in botany, a genus of trees, otherwiſe called ſyringa. See SYRINGA.

LILIACEOUS, an appellation given to ſuch flowers as reſemble that of the lily. See LILY.

LILIO-FRITILLARIA, a ſpecies of fritillary. See FRITILLARY.

LILIO-HYACINTHUS, a ſpecies of ſcilla or quill. See SCILLA.

LILIO-NARCISSUS, or AMARYLLIS, in botany, a genus of plants with a liliaceous flower, compoſed

poſed of ſix petals: its fruit is a ſuboval capſule with three cells, containing a great many ſeeds.

LILIUM, the lily. See LILY.

LILIUM *Convallium*, lily of the valley. See CONVALLIUM *Lilium*.

LILY, *Lilium*, in botany, the name of a large genus of plants, with a kind of bell-faſhioned flower, and is compoſed of ſix leaves, which are more or leſs expanded and bent back. The piſtil ſtands in the center of the flower, and finally becomes an oblong and trigonal fruit, which is divided into three cells, and contains a number of marginated ſeeds, arranged in a double order one on another. To this muſt be added, that the root is of a bulbous form, and is compoſed of a number of fleſhy ſcalesaffixed to an axis.

All ſorts of lilies and martagons are propagated by ſowing their ſeeds; and if the ſeeds are carefully ſaved from good flowers, the martagons very frequently afford very beautiful varieties.

The manner of ſowing them is this: ſome ſquare boxes ſhould be provided of about ſix inches deep, with holes bored in the bottoms to let out the wet; theſe muſt be filled with freſh, light, ſandy earth, and the ſeeds muſt be ſown on them pretty thick in the beginning of Auguſt, ſoon after they are ripe, and covered over about half an inch deep with light ſifted earth of the ſame kind. They ſhould be then placed where they may have the morning ſun; and if the weather prove dry, they muſt be watered at times, and the weeds carefully picked out. In the month of October, the boxes are to be removed to a place where they may have as much ſun as poſſible, and be ſecured from the north and north-eaſt winds. In ſpring the young plants will appear, and the boxes are then to be removed into their former ſituation; they ſhould be watered at times during the ſummer, and in Auguſt the ſmalleſt roots are to be emptied out of theſe boxes, and ſtrewed over a bed of light earth, and covered with about half an inch depth of light earth ſifted over them; they muſt here be watered and ſhaded at times, and defended from the ſeverity of the winter, by a light covering of ſtraw, or peas-haulm, in the hardeſt weather. In February, the ſurface of the bed ſhould be cleared, and a little light earth ſifted over it. When the leaves are decayed, the earth ſhould be a little ſtirred over the roots, and in the month of September following, a little light earth ſifted on. In the September of the following year, the roots muſt be tranſplanted to the places where they are to remain, and ſet at eight inches diſtance, the roots being placed four inches below the ſurface: this ſhould be done in moiſt weather. They will now require the ſame care as in the preceding winters; and the ſecond after they are tranſplanted, the ſtrongeſt roots will begin to flower. The fine ones ſhould then be removed at the proper ſeaſon into flower-beds, and planted at great diſtances from one another, that they may flower ſtrong. *Miller's Gard. Dict.*

The roots of the white lily are emollient, maturating, and greatly ſuppurative. They are uſed externally in cataplaſms for theſe purpoſes with ſucceſs. The common form of applying them is boiled and bruiſed; but ſome prefer the roaſting them till tender, and then beating them to a paſte with oil, in which form they are ſaid to be excellent againſt burns. Gerard recommends them internally in dropſies. The flowers are alſo uſed in emollient cataplaſms; and the oil, made by inſolation, is of common uſe in pains and tumours of all kinds.

LILY *of the Valley*. See the article CONVALLARIA.

LIMB, in a general ſenſe, denotes the border or edge of any thing: thus we ſay, the limb of a quadrant, of the ſun, of a leaf, &c.

LIMB, in anatomy, an appellation given the extremities of the body, as the arms and legs. See ARM and LEG.

LIMBERS, or LIMBER-HOLES, in ſhip-building, ſmall holes in the lower part of the timbers of a ſhip, cloſe to the keel; the purpoſe of which is to let the water, which may have come in by a leak, have a free paſſage to the well, where the pumps are fixed to draw it out; for this purpoſe every floor-timber is fitted with two of theſe, viz. one on each ſide of the kelſon.

LIMBER-BOARDS, ſhort pieces of plank which form a part of the ceiling of a ſhip's floor cloſe to the kelſon, and immediately above the limber-holes: they can be occaſionally removed to clear the limbers, when they are filled or clogged with any filth, ſand, gravel, &c.

LIME, *Calx*, a ſoft friable ſubſtance, obtained by calcining or burning ſtones, ſhells, and the like.

LIME-TREE, the Engliſh name of the tilia. See TILIA.

LIMITS *of Equations*, in algebra, a method of diſcovering the limits of the root of equations, by which their ſolutions are much facilitated.

Let any equation be propoſed, and having put p, q, r, s, t, v, &c. for the known quantities of the terms thereof, under their ſigns changed, viz. that of the ſecond p, that of the third q, of the fourth r, of the fifth s, and ſo on. And the ſigns of the terms being rightly obſerved, make $p = a$, $pa + 2q = b$, $pb + qa + 3r = c$, $pc + qb + ra + 4s = d$, $pd + qc + rb + sa + 5t = e$, $pe + qd + rc + sb + ta + 6v = f$, and ſo on, obſerving the ſame law in the continuation of the ſeries; and a will be the ſum of the roots, b the ſum of the ſquares of each of the roots, c the ſum of the cubes, d the ſum of the biquadrates, e the ſum of the quadrato-cubes, f the ſum of the cubo-cubes, and ſo on. As in the equation $x^4 - x^3 - 19xx + 49x - 30 = 0$, where the known quantity or co-efficient of

of the second term is —1, of the third —19, of the fourth +49, of the fifth —30: you must make $1=p$, $19=q$, $-49=r$, $30=s$. And there will thence arise $a=(p=)$ 1, $b=(pa+2q=1+38=)$ 39, $c=(pb+qa+3r=39+19-147=)$ —89, $d=(pc+qb+ra+4s=-89+741-49+120=)$ 723: wherefore the sum of the roots will be 1, the sum of the squares of the roots 39, the sum of the cubes —89, and the sum of the biquadrates 723; hence the roots of that equation are 1, 2, 3, & —5, and the sum of these 1+2+3—5=1; the sum of the squares, 1+4+9+25, is 39; the sum of the cubes, 1+8+27—125, is —89; and the sum of the biquadrates, 1+16+81+625, is 723.

Now, to collect the limits, between which the roots of the equation shall consist, if none is impossible, it will be necessary to observe, that when the squares of all the roots are affirmative, the sum of the squares will be affirmative; and therefore greater than the square of the greatest root; and also that the sum of the biquadrates of all the roots will be greater than the biquadrate of the greatest root, and the sum of the cubo-cubes greater than the cubo-cube of the greatest root. Wherefore, to obtain that limit which no roots can pass, find the sum of the square of the roots, and extract the square root of that sum, this root will be greater than the greatest root of the equation; but to approach the greatest root still nearer, find the sum of the biquadrates, and extract its biquadrate root; and for a third approximation, extract the cubo-cubical root of the sum of the cubo-cubes of the roots.

LIMITS *of a Planet*, its excursion from the ecliptic, or, which is the same thing, the points of its greatest latitude.

LIMITATION, in law, signifies a certain space of time allowed for bringing actions in.

LIMITATION *of Estate*, is the length of time an estate is to continue in the possession of a person or family.

LIMITTED PROBLEM, a problem that admits but of one solution, as to make a circle pass through three given points, not lying in the same right line.

LIMNING, the art of painting in water-colours, in contradistinction to painting, which is done in oil-colours. See PAINTING.

LIMON, the lemon-tree. See the article LEMON.

LIMOSELLA, in botany, a genus of plants whose flower is monopetalous and campanulated, divided at the top into five segments: the fruit is an ovate unilocular capsule, containing a great many seeds.

LIMPET, the English name of a shell-fish, called by authors patella. See PATELLA.

LINE, *Linea*, in geometry, a quantity extended in length only, without any breadth or thickness. It is formed by the flux or motion of a period. See FLUXION.

There are two kinds of lines, viz. right lines and curve lines.

Right lines are all of the same species, but curves are of an infinite number of different species. We may conceive as many as there may be different ratios between their ordinates and abscisses. See the articles ABSCISS and ORDINATE.

Curve lines are usually divided into geometrical and mechanical; the former are those which may be be found exactly in all their points; the latter are those, some or all of whose points are not to be found precisely, but only tentatively, or nearly.

Curve lines are also divided into the first order, second order, third order, &c. See the article CURVE.

Lines considered as to their positions, are either parallel, perpendicular, or oblique, the construction and properties whereof see under PARALLEL, &c.

Euclid's second book treats mostly of lines, and of the effects of their being divided and again multiplied into one another.

LINE, in geography, the same with equator. See the article EQUATOR.

LINES, in astronomy, are, 1. Fiducial line, the line or ruler which passes through the middle of an astrolable, or the like instrument, and on which the sights are fitted, otherwise called alhidade, index, dioptra, and mediclinium. See the article ASTROLABE. 2. The horizontal line. 3. Isochronal line. 4. Meridian line. 5. Line of the nodes. See the articles HORIZONTAL, ISOCHRONAL, MERIDIAN, and NODES.

LINES, in perspective, are, 1. Geometrical line, which is a right line drawn in any manner on the geometrical plane. 2. Terrestrial line, or fundamental line, is a right line wherein the geometrical plane, and that of the picture or draught, intersect one another. 3. Line of the front, is any right line parallel to the terrestrial line. 4. Vertical line, the common section of the vertical and of the draught. 5. Visual line, the line or ray imagined to pass from the object to the eye. 6. Line of station, according to some writers, is the common section of the vertical and geometrical planes. Others, as Lamy, mean by it the perpendicular height of the eye above the geometrical plane. Others a line on that plane, and perpendicular to the line expressing the height of the eye. 7. Objective line, the line of an object from whence the appearance is sought for in the draught or picture.

LINES, in dialling, are, 1. Horizontal line, the common section of the horizon and the dial-plane. See DIAL. 2. Horary lines, or hour lines, the common intersections of the hour-circles of the sphere, with the plane of the dial. 3. Substylar line, that line on which the style or cock of a dial is duly erected, and the representation of such an

hour-circle as is perpendicular to the plane of that dial. 4. Equinoctial line, the common interſection of the equinoctial and plane of the dial.

Contingent LINE. See CONTINGENT.

LINE *of Meaſures* is uſed by Oughtred, to denote the diameter of the primitive circle in the projection of the ſphere in plano, or that line in which the diameter of any circle to be projected falls. In the ſtereographic projection of the ſphere in plano, the line of meaſures is that line in which the plane of a great circle perpendicular to the plane of the projection, and that oblique circle which is to be projected, interſects the plane of the projection; or it is the common ſection of a plane paſſing through the eye-point and the center of the primitive at right angles to an oblique circle which is to be projected, and in which the center and pole of ſuch circle will be found.

LINE *of Direction of the Earth's Axis*, in the Pythagorean ſyſtem of aſtronomy, the line connecting the two poles of the ecliptic and of the equator when they are projected on the plane of the former.

LINE *of Direction*, in mechanics, that wherein a body actually moves, or would move, if it were not hindered. It alſo denotes the line that paſſes through the center of gravity of the heavy body to the center of the earth, which muſt alſo paſs through the fulcrum, or ſupport of the heavy body, without which it would fall.

LINE *of Gravitation*, of any heavy body, a line drawn through its center of gravity, and according to which it tends downwards.

LINE *of the ſwifteſt Deſcent*, of a heavy body, is the cycloid. See CYCLOID.

LINE *of a Projectile*. See PROJECTILE.

LINES *on the Plain Scale*, are the line of chords, line of ſines, line of tangents, line of ſecants, line of ſemitangents, line of leagues; the conſtruction and application of which, ſee under the words SCALE, SAILING, &c.

LINES *on Gunter's Scale*, are the line of numbers, line of artificial ſines, line of artificial tangents, line of artificial verſed ſines of rhumbs, line of artificial tangents of the meridian line, and line of equal parts; for the conſtruction and application of which, ſee GUNTER'S SCALE.

LINES *of the Sector*, are the line of equal parts, or line of lines, line of tangents, line of ſecants, line of polygons, line of numbers, line of hours, line of latitudes, line of meridians, line of metals, line of ſolids, line of planes. See the article SECTOR.

LINES, in fortification, are thoſe of approach, capital, defence, circumvallation, contravallation, of the baſe, &c. See the articles APPROACH, CAPITAL, &c.

To LINE *a Work*, ſignifies to ſtrengthen a rampart with a firm wall; or to encompaſs a parapet or moat with good turf, &c.

LINE, in the art of war, is underſtood of the diſpoſition of an army, ranged in order of battle, with the front extended as far as may be, that it may not be flanked. See ARMY.

LINE *of Battle*, in the marine, the array in which a fleet or ſquadron of ſhips of war is formed to engage with an enemy.

In this manoeuvre, the ſhips are drawn up about one hundred fathoms diſtant, a-head of each other, the admiral being in the center, whoſe chief judgment is to form it in a proper diſpoſition and ſtrength throughout, from the van to the rear; in doing which, particular care muſt be had to make the center ſtrong; for if that is forced or broke through, the battle is looked upon as loſt. Here it is to be obſerved, that in a ſea-action the center is made the ſtrongeſt; whereas in a land-fight it is the weakeſt; and the wings of an army are the ſtrongeſt, leſt the enemy by forcing a wing, ſhould have the advantage of flanking, and conſequently, putting the line in confuſion; for the ſame reaſon alſo, the van and rear of a fleet is not put into diſorder, becauſe care is taken to make them proportionally ſtrong to reſiſt the enemy; therefore the weakeſt part of the line will be in the quarters, as ſupported each way from the center throughout.

The line being thus formed, there ought to be a corps-de-reſerve, as many as may be thought neceſſary, if they can be diſpenſed with. But firſt, the line muſt ſtretch out the length of the enemy's, if poſſible, or elſe they will have the advantage, and by tacking and doubling upon your line, put the van and rear into confuſion.

It is a maxim in naval diſcipline, that a commanding flag-ſhip ſhould never go out of her way for any ſhip whatever, unleſs that ſhip ſhould be diſabled, or that a ſudden ſhift of wind takes her unexpectedly. The reaſon is ſelf-evident: if the admiral gives way for one, or backs and fills for another's fancy or miſconduct, there would be no end to ſuch negligence or overſight; therefore the commanding flag-ſhip expects that every ſhip in his fleet will obſerve and take her motions from him and his ſeconds, whoſe diſtance from the admiral ſhould be a ſtandard for every other ſhip to follow in that from each other, as near as poſſible, except when her ſignal is made to back or fill, or make more or leſs ſail.

The ſeconds to the commanding flag-ſhip are particularly to regard her, to move as ſhe does, whether the other ſhips do or not, or cannot do; for they are called ſeconds, to guard and attend the admiral's ſhip.

It is the duty of every officer, as ſoon as the ſignal is diſplayed for the line to croud, if poſſible, into his ſtation, and not to lie through indolence or negligence, braced to or a-back, but make ſail to windward, or bear away to leward, in order to

form the line immediately, and then each leading ſhip to mind her tack as the wind is, to lead and give room.

The commanding flag-officer, when his ſhips are arranged into a line, obſerves the ſtrength of the enemy's line throughout, and acts accordingly, making more or leſs ſail, or what motion he might think moſt to his advantage. He is not to take his motion from his leading ſhip, but upon ſome particular occaſion, ſignal, notice, or meſſage ſent to him.

In a line of battle, the weathermoſt fleet, or that which has the weather-gage, in the ſea language, is generally allowed to have the advantage, although there are ſeveral arguments on the other hand, in favour of the lee-ſide. We ſhall endeavour to ſtate the mutual advantages.

1. The weather-gage is ſooneſt clear of ſmoke; and of courſe, that line can better obſerve the ſignals which are ſpread, than the ſhips to leward can, which muſt have the continuance of both its own and of the enemy longer.

2. If the weather-ſhips are more in number than the enemy's fleet, they can detach ſome from their ſquadron, which bearing down upon the rear of the enemy, muſt infallibly throw them into diſorder.

3. The fire-ſhips of the weather-line can, when they are ordered, more eaſily bear down upon the enemy, than thoſe of the lee can ply to windward, which can never be done againſt a line in action; but the weather fire-ſhips can bear down againſt all the reſiſtance that can be made by the enemy.

Advantages of the lee-line.—1. If one, two, or more of the ſhips to windward ſhould be diſabled, they muſt inevitably drive to leeward, and become a prey to the enemy.

2. The ſhips of the lee-line can more readily bear away before the wind, and have their places ſupplied by ſhips from the corps-de-reſerve, in caſe of being diſabled on meeting with any diſaſter.

3. The line to leeward can keep their ports longer open in a ſtrong wind with a high ſea, when thoſe to windward, in all probability, may be obliged to ſhut the ports of their lower tier of guns, to prevent the water from ruſhing in between decks, which may be attended with the moſt fatal conſequences.

4. The lee-line can more eaſily obſerve the men on the decks of the ſhips to windward, as they heel, and when the ſmoke does not intercept their ſight: at which time the marines and top-men may eaſily take aim at, and deſtroy them with muſkets or carabines.

LINE A-BREAST, an arrangement in which the whole ſquadron advances uniformly with all the ſhips parallel to each other; ſo that the length of each ſhip forms a right line with the line a-breaſt. See DIVISION, SQUADRON, and NAVAL *Engagement*.

LINE in fencing, that part of the body oppoſite to the enemy, wherein the ſhoulders, the right arm, and the ſword, ought always to be found; and wherein are alſo to be placed the two feet at the diſtance of eighteen inches from each other. In which ſenſe a man is ſaid to be in his line, or got out of his line, &c.

LINE *of Demarcation*, or *Alexandrian* LINE, a meridian paſſing over the mouth of the river Moragnon, and by the capes Houmas and Mallabrigo, ſo called from pope Alexander VI. who, to end the diſpute between the crowns of Caſtile and Portugal, about their boundaries, drew an imaginary line on the globe, which was to terminate the pretenſions of each. By this partition, the Eaſt-Indies fell to the ſhare of the Portugueſe, and the Weſt-Indies to the Caſtillians.

LINE *of the Synodical*, in reference to ſome theories of the moon; is a right line ſuppoſed to be drawn through the centers of the earth and ſun: and, if it be produced, quite through the orbits: it is called the line of the true ſyzygies: but a right line imagined to paſs through the earth's center, and the mean place of the ſun, is called the line of the mean ſyzygies.

LINE, in genealogy, a ſeries or ſucceſſion of relations in various degrees, all deſcending from the ſame common father.

Direct line, is that which goes from father to ſon; being the order of aſcendants and deſcendants.

Collateral line is the order of thoſe who deſcend from ſome common father, related to the former, but out of the line of aſcendants and deſcendants: in this are placed, uncles, aunts, couſins, nephews, &c. See DIRECT and COLLATERAL.

LINE alſo denotes a French meaſure, containing the twelfth part of an inch, or the hundred and forty-fourth part of a foot.

LINES, in muſic, the name of thoſe ſtrokes drawn horizontally on a piece of paper, on and between which the characters and notes of muſic are diſpoſed: their number is commonly five; when another is added, for one, two, or more notes, it is called a ledger-line.

LINES, in heraldry, the figures uſed in armories, to divide the ſhield into different parts, and to compoſe different figures. Theſe lines, according to their different forms and names, give denomination to the pieces or figures which they form, except the ſtraight or plain lines.

LINEA *Alba*, in anatomy, a white line which runs from the cartilago enſiformis to the os pubis, dividing the abdomen exactly in the middle: and is formed out of the tendons of the oblique and tranſverſe muſcles.

It receives a twig of a nerve from the intercoſtals in each of its digeſtations or indentings.

LINEAMENT, among painters, implies the outlines of a face.

LINEAR PROBLEM, in mathematics, ſuch a problem as may be ſolved geometrically, by the interſection of two right lines: as meaſuring an inacceſſible height by means of two unequal ſticks, &c. It is alſo called a ſimple problem, and is capable but of one ſolution.

LINEN, in commerce, a well-known kind of cloth, chiefly made of flax. See FLAX.

LINIMENT, *Linimentum*, in pharmacy, a compoſition ſomewhat thinner than an unguent, and thicker than an oil, uſed for anointing the body in various intentions.

LINNET, *Linaria*, in ornithology, a bird of the ſize of the goldfinch; the head is ſmall and flatted; the eyes are ſmall, and hazel; the beak is conic, very ſmall, and ſharp at the point; the head, neck, and back are variegated with a bright brown and white, the breaſt and belly are pale, but in the male, eſpecially in the ſummer, there is a redneſs on the top of the head and all over the breaſt. This is a ſinging bird, and ſometimes has young ones four times a year, eſpecially if they are taken from the dam before they are able to fly, which may be done four days after they are hatched.

LINSEED, the ſeed of the plant linum. See the article LINUM.

Linſeed bruiſed and ſteeped in water, gives it very ſoon a thick mucilaginous nature, and communicates much of its emollient virtues to it. It is anodyne, attemperating, and of great ſervice in ſuppreſſions of urine from inflammation and heat; it envelops the acid ſalts of the urine, and prevents their vellicating and wounding the tender parts; and in ſome meaſure ſupplies the mucus of the bladder, when abraded and worn off. It is to be given in decoction, or infuſion, on theſe occaſions: the infuſion is not to be made too thick or mucilaginous, becauſe in that caſe it loads the ſtomach, and breeds flatulencies in the inteſtines. A ſlight infuſion of linſeed, by way of tea, is recommended by many as an excellent pectoral; and the ſeed is a common and very good ingredient in clyſters. Externally, this ſeed, ground to powder, is an excellent emollient; as is alſo the ſtrong mucilage, made by boiling the ſeeds along time: the oil drawn from it by expreſſion is of great ſervice in coughs, pleuriſies, and many other caſes.

LINSPINS, in the military art, ſmall pins of iron, which keep the wheel of a cannon, or waggon, on the axle-tree; for when the end of the axle-tree is put thro' the nave, the linſpin is put in, to keep the wheel from falling off.

LINSTOCK, in the military art, a wooden ſtaff, about three feet long, upon one end of which is a piece of iron, which divides in two, turning from one another, having each a place to receive the match, and a ſcrew to kept it faſt: the other end is pointed, and ſhod with iron, to ſtick in the ground. It is uſed, by gunners, to fire the guns.

LINT, *Linum*, the flax of which linen is made. See FLAX and LINEN.

In ſurgery, the term lint denotes the ſcrapings of linen which is uſed in dreſſing wounds, and is made up in various forms, as tents, doſſils, pledgets, &c. See the articles TENT, DOSSIL, &c.

LINTEL, in architecture, a piece of timber that lies horizontally over door-poſts and window-jambs, as well to bear the thickneſs of the wall over it, as to bind the ſides of the wall together.

LINUM, flax, in botany, a genus of plants, the flower of which is infundibuliform, conſiſting of five oblong petals; its fruit is a globoſe capſule, divided into ten cells, in each of which is a ſingle acuminated ſeed. See FLAX and LINSEED.

LION, *Leo*, in zoology, the ſtrongeſt and fierceſt of all quadrupeds.

The head of the lion appears very large in proportion to its body, and is the moſt fleſhy of the heads of all the known animals. Its jaw-bones alſo are remarkably large. The breaſt alſo appears very large, but this is only owing to the great quantity of long hair that covers it, for the ſternum is ſmaller than that of moſt animals of the ſame ſize. The tail, which is very long, appears alſo of the ſame thickneſs all the way, but this is wholly owing to the growth of the hair. The tail itſelf is largeſt at the baſe, and thence goes taper to the point; but the hair being very ſhort near its baſe, and continuing to grow longer all the way, as that decreaſes in thickneſs, is ſo exactly proportioned in this growth, that it always gives the whole tail this regular appearance.

The lion has fourteen teeth in each jaw, four inciſores, four canine, and ſix molares. The inciſores are ſmall; the canine are unequal in ſize, two being very large and two very ſmall; the large ones are an inch and half long, and are the only ones the ancients allowed to be canine teeth. The molares alſo are irregular in ſize, the anterior ones being very ſmall, the others large, and terminated by three or four points, forming a ſort of flower-de-luce.

Ariſtotle, Ælian, and others ſay, that the neck of the lion is all compoſed of one unjointed bone. It appears indeed very rigid in this creature, but it does not proceed from ſo ſtrange a cauſe, but is found owing to this, that the ſpinoſe apophyſes of the vertebræ of the neck are long, and faſtened together by extremely ſtrong and rigid ligaments.

The tongue of the lion is very rough and rigid, being covered with a great number of prominences of a hard matter, reſembling that of a cat's claws, and nearly of the ſame ſize, the baſe of each being a round

a round fleſhy prominence on the ſurface of the tongue.

The eyes of the lion are clear and bright, even after the creature is dead. The common obſervation that this creature ſleeps with its eyes open, is founded on this, that it has a very thick membrane lodged in the greater canthus of the eyes, which it can extend over the whole eye upon occaſion, as birds do their membrana nictitats, and thus will have no occaſion to ſhut its eye-lids, in order to exclude the light. It is very remarkable, that the common cat has all the ſingular ſtructure of the ſeveral parts as the lion has; its claws, feet, tongue and eyes, being of the ſame kind, and its internal parts bearing as ſtrong a reſemblance.

The heart of the lion is greatly larger than that of any other creature of the ſame ſize, being ſix inches long, and four in diameter, in the largeſt part, and terminating in a very ſharp point. The brain is as remarkably ſmall; and upon the compariſon of this with the great quantity of brain in a calf, and purſuing the obſervation through ſeveral other creatures, as to the proportion of brain they have, it does not appear that a ſmall quantity of brain is a mark of folly, but uſually of great ſubtlety, and of a cruel diſpoſition. *Mem. pour l'Hiſtoire des Anim.*

LIONCELLES, in heraldry, a term uſed for ſeveral lions borne in the ſame coat of arms.

LIP, *Labinum*, or *Labium*, in anatomy, the exterior fleſhy covering of the mouth. See MOUTH.

The cheeks and lips form the ſides and entry of the cavity of the mouth. They are formed in general by the connexion of ſeveral fleſhy portions, of different breadths, fixed round the two jaws, covered on the outſide with the ſkin and fat, and lined on the inſide by a glandulous membrane. Beſides this, the lips have a ſoft ſpongy ſubſtance, which ſwells and ſubſides on certain occaſions, independently of the action of the muſcles; and is mixed with fat.

The arteries which go to the lips are ramifications of the external carotid, and principally of the external and internal maxillary branches. See ARTERY.

The veins are ramifications of the external anterior jugular. See VEIN.

The nerves of theſe parts come from the maxillaris ſuperior and inferior, which are branches of the fifth pair; and alſo from the portio dura of the auditory nerve, or ſympatheticus minimus, the ramifications of which are ſpread in great numbers on all theſe parts and communicate very ſingularly with the nerves of the fifth pair in ſeveral places.

Hare-LIPS, in ſurgery, a diſorder in ſome perſons wherein the upper-lip is ſo divided, as to reſemble a hare's lip. This diviſion is ſometimes ſmall, at other times it is double, like the letter M, and then termed the double hair-lip. Beſides the deformity cauſed by this diſorder, it hinders infants from ſucking, and adults from ſpeaking diſtinctly. Sometimes this accident happens to the lower lip from the ill treatment of a wound, and this is called the ſpurious hare-lip; the true kind is born with the infant. The leſs and more equal the fiſſure of the hare-lip is, it is generally ſo much the more eaſily cured. In ſome infants, the diviſion of the lip is ſo large and irregular, that there can be but little hopes of a cure, which may, however, be eaſily performed on the very ſame lip, when adult. Sometimes too we meet with a tooth projecting forward into the fiſſure; in this caſe it cannot be cured without firſt taking out the tooth. In a recent hare-lip, or one made by a wound, the cure is to be performed by the knotted ſuture. See the articles SUTURE and WOUND.

In curing the hair lip, where part of the lip is wanting, no attempt can be made to ſupply what is deficient, but only to unite thoſe parts which are divided by taking off the ſkin from the edges of the fiſſure, and then cauſing them to unite and grow together, by paſſing through them two or three needles, made of gold or ſilver, pointed with ſteel from the right to the left, beginning with the upper part of the fiſſure, and inſerting them at about a ſtraw's breadth from each other: the ſurgeon having thus entered the needles, and cleanſed the bleeding lips with a ſponge, he takes a piece of ſtrong waxed thread or ſilk, and faſtening it about one end of the needle, he winds it over the other end, and back again. Having done this he afterwards ſecures it by a knot; by this means the edges of the lips are brought cloſe together, and the upper-part or ſurface kept ſmooth and even. To heal the wound internally, it is dreſſed with ſoft lint dipped in honey of roſes, and put between the gums and lip; but this practice can only be followed with adults: the external part of the wound is at the ſame time dreſſed with balſam of Peru, or ſome other vulnerary unguent, covered with lint and compreſs, and over that a ſticking plaſter with four heads, two of which are faſtened on the left ſide of the lip, and two upon the right, and the whole ſecured by a ſling or fillet, whoſe extremities may be faſtened about the head, either by a knot or pins. But it muſt here be obſerved, that when the fiſſure appears large and deep, ſo that the two parts of the lip cannot be eaſily joined, it will be neceſſary, before the above operation, to divide the frænulum of the upper-lip from the gum, with a pair of ſciſſars, but without wounding the gum, or uncovering the jaw. Though the hæmorrhage is often very plentiful in performing theſe operations on young infants, yet it is not dangerous, ſince it prevents an inflammation, and generally ceaſes after tying the bandages.

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The dreſſings ought not to be moved before the third day, unleſs ſome accident makes it neceſſary; and then it muſt be done with great caution, to avoid ſeparating the parts in contact. If the lips of the wound appear conjoined, three or four days after the operation, you may then venture to draw out the middle needle, when there are three, or the upper one, when there are only two; and two or three days after draw out the other: the cure muſt be completed by dreſſing every day, as at firſt.

LIPOTHYMIA, in medicine, the name of a diſeaſe uſually confounded with the ſyncope, but really different from it in many particulars.

The lipothymia is a very conſiderable abolition of the vital and animal faculties, at leaſt to appearance: and the ſyncope is a plenary or total abolition of them, as far as appears to us at the time. It is eaſy to ſee, however, that theſe are only two different ſtages of the ſame diſtemperature. The lipothymy is ſometimes an idiopathic, ſometimes a ſymptomatic diſeaſe, and moſt frequently attends the ſcurvy, malignant fevers, and other diſorders; the ſyncope differs from death only in degree: and the body being flaccid in this, and growing rigid under the laſt convulſions in death, is the only diſtinction of them in extreme caſes.

LIQUIDAMBER, in botany, a genus of the monoecia claſs of plants, the male flowers of which are numerous, and grow in a long looſe conical amentum; they are deſtitute of a corolla, being each compoſed of a four leaved involucrum, with a great number of very ſhort ſtamina. The female are alſo apetalous, and are placed at the baſe of the male ſpike, collected in a globe; theſe have a double involucrum, alſo a campanulated perianthium, with many protuberances. The fruit is an ovate unilocular capſule, with two valves at top, and collected in a ligneous globe, and contains many oblong pointed ſeeds.

The liquidamber-tree is a native of ſeveral parts of North America, where it riſes to the height of forty feet; the leaves are ſhaped like thoſe of the leſſer maple, of a dark green colour, and their upper ſurfaces ſhining; the flowers come out in the ſpring, growing in ſpikes, and are of a ſaffron colour.

The planks of this tree being beautifully veined, are often uſed in America for wainſcoting rooms, but it requires a long time to ſeaſon the boards, otherwiſe they are apt to ſhrink.

LIQUOR MINERALIS ANODYNUS, is a name given by Hoffman to a liquor of his invention, famous at this time in Germany, and ſuppoſed by Burggrave to be made in this manner: take oil of vitriol, and Indian nitre, of each four ounces; diſtil the ſpirit gradually from this, by a retort: pour two ounces of the ſpirit cautiouſly and ſucceſſively, into fifteen ounces of ſpirit of wine, highly rectified; diſtil this, and there comes over a very fragrant ſpirit: this is to be again diſtilled, to render it perfectly pure, adding firſt to it a ſmall quantity of oil of cloves, and a quantity of water, equal to that of the ſpirit; after this, as ſoon as the watery vapours begin to riſe, the whole proceſs is to be ſtopped, and the ſpirit kept alone in a bottle, well corked. This has great virtues as an anodyne, diophoretic, antiſeptic, and carminative. It is not certain that this is the ſame with Hoffman's, that author never having publiſhed his manner of making it; but it appears the ſame to the ſmell and taſte, and has the ſame virtues.

LIQUORICE, *liquoritia glycyrrhiza*, and *radix dulcis*, a ſweet root of conſiderable uſe in medicine.

This plant, deſcribed by all the botanical authors under the name of glycyrrhiza vulgaris, grows to four or five feet high, its ſtalks are hard and woody, its leaves are ſmall and roundiſh; and they ſtand many together on the two ſides of a rib, making what authors call a winged leaf. They are viſcous to the touch; the flowers are of the papilionaceous kind, ſmall and bluiſh.

The plant is of the diadelphia decandria of Linnæus, and of the herbæ flore papilionaceo ſeu leguminoſæ of Mr. Ray. Liquorice grows wild in many parts of France, Italy, Spain, and Germany. It is cultivated in great abundance in Yorkſhire, and in many other parts of England; and by the good order we keep the ſoil in, produce better roots, longer, evener, and more ſucculent than are to be had from any other part of the world. The reſt of Europe is in great meaſure furniſhed by what grows about Bayonne and Saragoſſa in Spain.

The ground deſigned for liquorice muſt be well dug, and dunged the year before, that the dung may be thoroughly rotted in it; and juſt before it is planted, the earth is to be dug three ſpades deep, and laid very light. The plants to be ſet ſhould be taken from the ſides or heads of the old roots, and each muſt have a very good bud, or eye, or otherwiſe they are ſubject to miſcarry; they ſhould alſo be about ten inches long, and perfectly ſound. The beſt ſeaſon of planting them is the end of February, or the beginning of March, and this muſt be done in the following manner: the rows muſt be marked by a line drawn a-croſs the bed, at two feet diſtance; and the plants muſt be ſet in theſe by making a hole of their full depth, and ſomething more, that the eye of the root may be an inch below the ſurface: they muſt alſo be ſet two feet diſtance from each other in the rows. When this is done, the ground may be ſowed over with onions, which, not rooting deep, will do the liquorice roots no injury for the firſt year. In October, when the ſtalks of the liquorice are dead, a little very rotten

dung ſhould be ſpread over the ſurface of the ground. Three years after the time of planting, the liquorice will be fit to take up for uſe; and this ſhould be done juſt when the ſtalks are dead off; for, if taken up ſooner, the roots are very apt to ſhrink greatly in their weight. The roots about London look browner than thoſe which have been propagated in a leſs rich ſoil, but then they are much larger, and grow quicker to their ſize. *Miller's Gard. Dict.*

Liquorice is an excellent medicine in coughs, and all diſorders of the breaſt and lungs. It obtunds the ſharpneſs of acrid and ſalt humours. It is alſo recommended againſt diſorders of the kidneys and bladder, and is ſaid to take off the ſenſe of pain in many terrible complaints. It is an ingredient in almoſt all decoctions and ptiſans, in which it is eſteemed for obtunding acrimony, and for giving the whole a very pleaſant taſte, and drowning the worſt flavour of the other ingredients.

LIQUORICE *Juice*, the inſpiſſated juice of the common liquorice root, and is brought to us in rolls or cakes, covered uſually with bay leaves from Spain and Holland, from the firſt of which places it obtained the name of Spaniſh juice. It is to be choſen firm, but not tough, hard, and when broken, of a fine ſhining ſurface; ſuch as perfectly melts in the mouth, and does not taſte of burning, nor leaves any harſh or gritty particles between the teeth.

The manner of preparing it in Spain is this: they take up the roots in the month of July; they clean them perfectly as ſoon as taken out of the earth, and then hang them up in the air till nearly dry; after this they cut them into thin ſlices, and boil them in water till the decoction is extremely ſtrong; they then preſs it hard out, to obtain all the juice they can from the root. They ſet this decoction by, to ſettle a little, and when it has depoſited its courſeſt parts, they pour it off into veſſels, in which they evaporate it over a fire, ſtrong at firſt, but milder afterwards, till it becomes of the conſiſtence of a thick extract; they then let the fire go out, and when the extract is ſo cool that they can handle it, they take out large parcels of it at a time; and working them well in the hands, they roll them out into long cylindric maſſes, which they cut out into ſuch lengths as they pleaſe; and rolling them over a parcel of half dried bay leaves, they pick up enough of them for a covering, which are in that condition laid in the ſun till perfectly dried; there is great nicety required at the end of the evaporation, to get the extract to a proper conſiſtence, without letting it burn. It is this the Spaniards are famous for: a great deal of liquorice juice is made in other places, but it is in a great meaſure either under-boiled, and conſequently ſoft, or is burnt.

Liquorice juice has the ſame virtues with the root it is produced from. It is a very famous remedy among the common people for coughs, and all diſorders of the breaſt and lungs. It is commonly taken alone, holding a ſmall piece of it in the mouth till it gradually melts there; but the more agreeable way of taking it is in the form of lozenges, of which there are many kinds, which it is the baſis of; in theſe it is mixed with other pectoral ingredients, and has the advantage of melting more eaſily in the mouth than in its own form. It is alſo an ingredient in the theriaca and ſome other compoſitions of the ſhops.

LIST, in commerce, the border of cloth, or of a ſtuff; ſerving not only to ſhew their quality, but to preſerve them from being torn in the operations of fulling, dyeing, and the like. See CLOTH, &c.

Liſt is uſed on various occaſions; but chiefly by gardeners for ſecuring their wall trees.

LIST, in architecture, a little ſquare moulding, otherwiſe called a fillet, liſtel, &c. See the articles FILLET and MOULDING.

LISTING, the ſame as heeling, or inclining to one ſide. See HEEL and CAREEN.

LITANY, a ſolemn form of ſupplication to God, in which the prieſt utters ſome things fit to be prayed for, and the people join in their interceſſion.

LITERATI, in general, denotes men of learning; but is more particularly uſed by the Chineſe, for ſuch perſons as are able to read and write their language, which is remarkably difficult.

LITHARGE, a metalline ſubſtance, formed of the ſpume of lead.

The word is Greek, λιθαργυρος, which is formed of λιθος, a ſtone, and αργυρος, ſilver, becauſe it is found in furnaces where ſilver is refined.

This preparation, or, as it may be more properly called, recrement of lead, is of two kinds, differing in colour, though in no other quality: the ancients, as well as moderns, obſerved this difference, and called the one litharge of gold, and the other litharge of ſilver. This recrement of lead is not prepared by a formal proceſs on purpoſe; it is collected from the furnaces where ſilver is ſeparated from lead, or from thoſe where gold and ſilver are purified by means of that metal; but in the furnaces uſed for either of theſe purpoſes, it is generally run into lead again, to ſerve for the ſame or other uſes. The litharge ſold in the ſhops is produced in the copper works, where lead has been uſed to purify that metal, or to ſeparate ſilver from it. Of all the various metalline and mineral ſubſtances, which are ſeparated from gold or ſilver, by means of lead, there is none but copper which remains embodied in and intimately joined with that metal after ſcorification; the others being either not at all received into the body of it, or, if they are, being either deſtroyed before ſcorification; or, finally, if they remain mixed

mixed with it longer, they ſplit and deſtroy the veſſels. The recrement produced from this combination of lead with copper, is our common litharge. It is of a yellower or redder colour, as the fire has been more or leſs ſtrong; and is always compoſed of a multitude of thin flakes, reſembling the ſpangles of talc, in thoſe foſſils called micæ or glimmors.

The greateſt quantities of litharge are brought from Sweden, Germany, and Denmark. Poland furniſhes ſome, as does alſo England, but the Dantzic kind is eſteemed the moſt valuable. The beſt litharge is that which is moſt calcined, and of the livelieſt colour. Litharge, on the whole, is properly lead vitrified, either alone or with a mixture of copper.

Litharge is ſoluble in oil and all other unctuous ſubſtances, and thus diſſolved, it makes the baſis of a great part of the ointments and plaſters of the ſhops. It is drying, abſtergent, and ſlightly aſtrictive; and hence it is of great uſe in cleanſing ulcers, and diſpoſing them to incarnate.

LITHOCOLLA, a cement uſed by lapidaries for faſtening precious ſtones together. See the article CEMENT.

LITHONTRIPTICS, medicines which either break, or are ſuppoſed to have the virtue of breaking ſtones in the urinary paſſes.

The word is derived from the Greek λιθος, a ſtone, and θρυπτω, to break.

LITHOPHYTA, in botany, a ſubdiviſion of plants, ſo called from their approaching to a ſtony hardneſs, comprehending the iſis, ſpongia, millepora, tubipora, &c.

LITHOSPERMUM, gromwell, in botany, a genus of plants, the corolla of which conſiſts of a ſingle petal of the length of the cup: the tube is cylindric, the limb ſemiquinquifid, obtuſe, and erect: there is no pericarpium, but the cup becomes patulous and long, containing four broad, oval, acuminated, and hard ſeeds.

The ſeeds of this plant, being the only parts uſed in medicine, are accounted diuretic. Emulſions are made of them, with dog's graſs water.

LITHOTOMY, in ſurgery, cutting for the ſtone. See the article STONE.

The ſeveral methods of performing this dangerous operation, according to Heiſter, are four: the firſt, and moſt ancient, is the apparatus minor, called likewiſe the Celſian or Guidonian method: the ſecond, the apparatus magnus, or Marianus's method; the latter better termed the new, and the former the old method: the third is the apparatus ultus, or hypogaſtric ſection, wherein the inciſion is made at the lower part of the obdomen in the anterior ſide of the bladder, immediately above the os pubis; whereas in the reſt it is made in the perinæum, between the anus and the ſcrotum: the fourth, and moſt modern method, was invented towards the end of the laſt century, and is termed the lateral operation.

1. The firſt method is now entirely laid aſide, though Heiſter thinks it practicable on boys under fourteen: the wound of the bladder in this operation, ſays Sharp, is made in the ſame place as is now practiſed in the lateral method; but its being impracticable on ſome ſubjects, and uncertain in all others, has made it to be univerſally exploded.

2. In performing lithotomy by the apparatus major, Mr. Sharp's directions for the ſituation of the patient are thus. Having laid the patient on a ſquare horizontal table, three feet four inches high, with a pillow under his head, let his legs and thighs be bent, and his heels made to approach his buttocks by tying his hands to the ſoles of his feet with a couple of ſtrong ligatures; and to ſecure him more effectually from ſtruggling, paſs a double ligature under one of his hams, and carry the four ſtrings round his neck to the other ham: then paſſing the loop underneath, make a knot by threading one of the ſingle ends through the loop; and thus the thighs are to be widened from each other, and firmly ſupported by proper perſons.

The patient thus ſituated, Heiſter directs the operation as follows: the operator, dipping the beak of a ſizeable and grooved ſteel catheter in oil, conveys it through the urethra into the bladder, and being aſſured there is a ſtone, turns the crooked part of the catheter in the bladder and urethra towards the left ſide of the perinæum, but the handle and penis which contains it, towards the right inguen, then delivers it to the aſſiſtant, who holds up the ſcrotum in the other hand; for the crooked convex part of the catheter thus elevated in the perinæum, renders that part of the urethra which is to be divided, ſufficiently perceptible both to the ſight and touch. He next lays hold of the integuments of the perinæum with the fingers of his left hand, holding in his right the inciſion-knife, wrapped in linen, as he would do a pen for writing: with this he makes a longitudinal inciſion downwards, about the middle of the left ſide of the perinæum near the future, through the fat; then he again feels for the catheter, and afterwards divides the urethra in a direct line downwards, ſo that the end of the knife may paſs into the groove of the catheter. After a proper inciſion, the ſurgeon parts with his knife, inſerting in the groove of the catheter, if an aſſiſtant holds it, the nail of his finger or thumb: then he takes a male conductor, dips it in warm oil, and having paſſed it through the groove of the catheter and neck of the bladder into the bladder itſelf, extracts the catheter.

The male conductor being thus paſſed, a female conductor is introduced upon it, in ſuch a manner as the latter receives the prominent back of the former in its groove, and conveys it ſafely into the bladder through its neck. After this, the two conductors

ducters are gently ſeparated by their handles, and then a ſtraight forceps, dipt in oil and ſhut very cloſe, is carefully conveyed into the bladder between the conductors. The forceps, after it is introduced, and the conductors withdrawn, muſt be opened ſeveral times to dilate the wound, and then ſhut to ſearch for the ſtone: when the ſtone is found, they muſt be opened with both hands, in ſuch a manner that one jaw, if poſſible, may lay hold under the ſtone, and the other above it. When the ſtone is thus intercepted, the forceps, by a gentle motion from ſide to ſide, muſt be brought towards the rectum, and the ſtone extracted downwards, becauſe the parts dilate and yield more eaſily that way, while upwards they meet with a reſiſtence from the os pubis: but if it lies concealed in any part of the bladder, and cannot be laid hold of by the forceps, the operator muſt paſs the two firſt fingers of his left hand into the anus, elevate the ſtone, and force it into them. If it is ſituated in the upper part of the bladder, behind the oſſa pubis, the inferior part of the abdomen muſt be preſſed downwards by the hand, that it may commodiouſly be taken hold of, and drawn out by the ſtraight or crooked forceps; and if it is lodged on either ſide, the crooked inſtrument is moſt convenient.

When the ſtone is too large to be extracted whole, it muſt be broken by a forceps with teeth, and the fragments to be drawn out one after another. Laſtly, if the ſtone is too large and too hard to be either extracted or broken, a prudent ſurgeon will deſiſt, and heal the wound, or leave a fiſtula for the diſcharge of the urine. The ſtone being thus extracted, and the bladder cleared, the wound is cleanſed with a ſponge, the ligatures untied, the patient put to bed, and the wound now dreſſed with the doſſils of ſcraped lint: if the hæmorrhage be too profuſe, it may be ſtopped by pledgets of lint dipt in a proper ſtyptic, and the arteries compreſſed with the fingers till it ſtops.

Theſe muſt be covered with a linen bolſter, and a large ſquare compreſs without a plaſter, ſecuring the whole with the T bandage, or that with four heads; and if they are ineffectual, the artery muſt be tied up with a crooked needle and thread. See the article HÆMORRHAGE.

After dreſſing, the patient muſt be ſupplied with plenty of ptiſan, barley-water, or a ſtrengthening and compoſing emulſion; his diet ſhould be the ſame as for people in fevers, or after great wounds. See the articles FEVER and WOUND.

3. The apparatus altus, or high operation, is performed as follows:—The patient being duly prepared, and laid in a proper ſituation, a hollow ſilver catheter, with a flexible leathern tube at the end of it, is to be introduced into the bladder: to the tube muſt be fitted a large ſyringe, for the injecting of ſuch warm water, barley-water, or milk, as the patient can bear. When this is done, the catheter is extracted: then, while an aſſiſtant introduces his two fore-fingers into the anus to elevate the ſtone and bladder, the operator makes an inciſion in a right line through the ſkin, fat, and abdominal muſcles, immediately above the oſſa pubis. The external wound ſhould be three fingers breath long in children, and four in adults; then introducing the left index, the ſurgeon feels for the liquor that diſtends the bladder, and then makes an inciſion into the bladder immediately above the juncture of the oſſa pubis: after which he paſſes a ſmall knife into the body of the bladder, ſo as to make a ſmall wound with the point only; through this aperture he paſſes a crooked or ſtraight knife, armed with a button, whereby he enlarges the wound upwards the breadth of one or two fingers. He then introduces his left index to draw the upper part of the bladder towards the navel, and then enlarges the wound downwards. Immediately after, he introduces the fore-finger of the other hand, and examines the ſize and ſituation of the ſtone, and accordingly he enlarges the wound either upwards or downwards, in order to extract it; and when the ſtone is extracted, and nothing left, the wound is dreſſed, and patient treated much in the ſame manner as in the former caſe.

4. The fourth method, which is called the lateral operation, was performed by Cheſelden thus: every thing being properly prepared, he introduces a catheter, and afterwards makes an inciſion of a proper length, beginning where they end in the apparatus major, and continuing it downwards between the accelerator urinæ, and erector penis, on the left ſide of the inteſtinum rectum; and directing his knife to the poſterior part of the catheter, through the inferior and lateral part of the bladder, behind the proſtrate gland, and above the ſeminal veſicles; he then continues it forwards through the ſphincter of the bladder, and left ſide of the proſtrate glands into the membranous part of the urethra, even to its bulb, which preſerves the rectum better than the lateral method.

Among Cheſelden's emendations, Douglaſs enumerates theſe: 1. If he finds the patient's pulſe low after the operation, he applies bliſters to the arms, which effectually raiſe his ſpirits. 2. If the wound grows callous, he lays on a piece of bliſter plaſter to erode it, by which new fleſh pullulates, and the wound unites. 3. If the wound be putrid, he mixes a little verdigris with ſome digeſtive ointment.

Women are leſs ſubject to the ſtone in the bladder than men, and their urinary paſſages are more ſhort and lax, ſo that in general, the ſtone being but ſmall, diſcharges itſelf with the urine, and when it happens to increaſe in the bladder, we have inſtances of its coming away ſpontaneouſly. Douglas propoſes to extract a ſmall ſtone in a woman, by dilating

dilating the urethra with a tent of gentian root, or prepared ſponge; but when the ſtone is large, he approves of the high operation, diſtending the bladder with warm water, and compreſſing the urethra by an aſſiſtant's finger in the vagina, and then making an inciſion into the bladder immediately above the os bubis. This, Heiſter ſays, is a very proper method, when the ſtone is very large, and the patient young and healthy; but Morand, when the ſtone is ſmall, prefers the apparatus major.

Upon the whole, lithotomy appears to be a dangerous and precarious operation, nor can one method alone be depended on; but the ſurgeon muſt be determined in the choice, by the particular circumſtances of the caſe.

LITURGY, λειτουργια, a name given to thoſe ſet forms of prayer which have been generally uſed in the Chriſtian church. Of theſe there are not a few aſcribed to the apoſtles and fathers, but they are almoſt univerſally allowed to be ſpurious.

The liturgy of the church of England was compoſed in the year 1547, ſince which time it has undergone ſeveral alterations, the laſt of which was in the year 1661, and of this liturgy Dr. Comber gives the following character:—"No church was ever bleſſed with ſo comprehenſive, ſo exact, and ſo inoffenſive a liturgy as ours; which is ſo judiciouſly contrived, that the whole may exerciſe at once their knowledge and devotion; and yet ſo plain, that the moſt ignorant may pray with underſtanding; ſo full, that nothing is omitted, which ought to be aſked in public; and ſo particular, that it compriſeth moſt things which we would aſk in private; and yet ſo ſhort, as not to tire any that have true devotion. Its doctrine is pure and primitive; its ceremonies ſo few and innocent, that moſt of the Chriſtian world agree in them; its method is exact and natural, its language ſignificant and perſpicuous, moſt of the words and phraſes being taken out of the Holy Scripture, and the reſt are the expreſſions of the firſt and pureſt ages."

And in the opinion of the moſt impartial and excellent Grotius (who was no member of, nor had any obligation to, this church) "the Engliſh liturgy comes ſo near the primitive pattern, that none of the reformed churches can compare with it." Again, he ſays, "In the prayers, a ſcholar can diſcern cloſe logic, pleaſing rhetoric, pure divinity, and the very marrow of the ancient doctrine and diſcipline; and yet all made ſo familiar, that the unlearned may ſafely ſay, Amen."

LITUUS, in Roman antiquity, a ſhort ſtraight rod, only bending a little at one end, uſed by the augurs. See AUGUR.

LIVER, *Hepar*, in anatomy, a large and pretty ſolid maſs of a dark red colour, a little inclined to yellow, ſituated immediately under the arch of the diaphragm, partly in the right hypochondrium, which it fills almoſt entirely, and partly in the epigaſtrium, between the appendix enſiformis and ſpina dorſi, and terminating commonly in the left hypochondrium, into which it ſometimes runs a conſiderable way.

LIVER-WORT, *Lichen*, in botany. See the article LICHEN.

Noble LIVER-WORT. See HEPATICA.

LIVERY *of Seiſin*, in law, ſignifies delivering the poſſeſſion of lands, &c. to him who has a right to them.

LIVERYMEN, of London, are a number of men choſen from among the freemen of each company. Out of this body the common-council, ſheriff, and other ſuperior officers, for the government of the city, are elected, and they alone have the privilege of giving their votes for members of parliament; from which the reſt of the citizens are excluded.

LIVES, or *Inſurance of* LIVES. See the articles INSURANCE and INTEREST.

LIVRE, a French money of account, containing twenty ſols.

LIXIVIOUS, *Lixiviate*, in chemiſtry, ſuch ſalts as are extracted from the aſhes of burnt vegetables by means of lotion.

LIXIVIUM, a ley or water impregnated with the ſalts of burnt vegetables.

What is left after the evaporation of ſuch a liquor is called a lixivious ſalt.

Lixiviums are of great uſe in medicine, bleaching, ſugar-works, &c.

LIZARD, *Lacerta*, in zoology, a genus of amphibious animals, the body of which is oblong and rounded, the legs four, and the hinder part terminated by a tapering tail.

LOACH, the Engliſh name of a fiſh, called by Artedi, the ſmooth ſpotted cobitis, with a cylindrical body.

LOAD, among miners, denotes a vein of ore. See MINE.

It is alſo uſed for nine diſhes of ore. See the article DISH.

LOADSTONE, the ſame with magnet. See MAGNET.

LOAMS, in natural hiſtory, are defined to be earths, compoſed of diſſimilar particles, hard, ſtiff, denſe, and hard and rough to the touch; not eaſily ductile while moiſt, readily diffuſible in water, and compoſed of ſand and a tough viſcid clay. Of theſe loams, ſome are whitiſh, and others brown or yellow.

Some call loam, the moſt common ſuperficial earth that differs from ſand or clay; but the moſt general appellation of loam is applied to a ſoft fat earth, partaking of clay, but eaſy to be wrought.

It is found by experience, that plants of all kinds will grow in it; and wherever it is found, it appears to be a more beneficial ſoil to plants than any other.

LOBATE, or LOBED LEAVES, are such as are divided to the middle into parts that stand wide from each other, and have their margins convex; and from the number of these they are called bilobate, trilobate, quadrilobate, or quinquelobate; consisting of two, three, four, or five lobes.

LOBE, in anatomy, denotes each of the two parts of which the lungs consist. See LUNGS.

It is also applied to the divisions of the liver. The word is derived from the Greek λοβος, the extremity of a thing.

LOBELIA, in botany, a genus of plants, the flower of which is monopetalous and slightly ringent: the fruit is an oval berry with two cells, each containing a single seed.

LOCAL, in law, something fixed to the freehold, or tied to a certain place: thus real actions are local, since they must be brought in the country where they lie; and local customs are those peculiar to certain countries and places.

LOCAL PROBLEM, among mathematicians, such an one as is capable of an infinite number of different solutions, by reason that the point which is to resolve the problem may be indifferently taken within a certain extent, as suppose any where, within such a line, within such a plane, figure, &c. which is called a geometric locus, and the problem is said to be a local or indetermined one. See LOCUS.

LOCHIA, in physic, the purgations of the uterus after child-birth. These consist, generally, for the two first days of a kind of bloody serosity, and gradually become more white, viscous, and less in quantity; which, during the whole time, cannot be determined, some women having more, others less: nor can the duration of the flux be limitted to any particular time.

The lochia sometimes flow in too large quantities, either on account of something retained in the uterus, which prevents it from contracting duly; or a too great fluidity or agitation of the blood. If it proceed from a retention of something in the uterus, this must, if possible, be taken away by the hand. But if it proceed from a too great fluidity or agitation of the blood, temperating decoctions of barley, jellies, emulsions, opiates, and astringents, are to be administered.

But when a deficiency in the lochia, or their utter suppression, happens, all possible means should be used to procure this salutary discharge. For this purpose, mild anti-acids, diluters, and aperients, are to be exhibited. But great stress is to be laid on aperient and relaxing topics, clysters, fomentations, plasters, liniments, cupping on the inferior parts, pessaries and suppositories.

Boerhaave advises not to let blood in the above-mentioned disorders, without the utmost necessity.

LOCK, a well known instrument for securing doors, chests, &c. and only to be opened by a key. See the article KEY.

LOCUS GEOMETRICUS, in geometry, denotes a line, by any point of which, a local or indeterminate problem is solved.

If a right-line suffice for the construction of the equation, it is called locus ad rectam; if a circle, locus ad circulum; and these were called plain loci: if a parabola, hyperbola, locus ad parabolam, hyperbolam, &c. And those were called solid loci.

Wolfius and the moderns more commodiously divide loci into orders, according to the number of dimensions to which the indeterminate quantities rise.

When in an equation there are two indetermined quantities x and y, then for each particular value of x there may be as many values of y as it has dimensions in that equation. So that if AP, a part of the indefinite line AE, represent x, and the perpendiculars PM (plate LXVI. *fig.* 3.) represent the corresponding values of y, then there will be as many points M, the extremities of these perpendiculars or ordinates, as there are dimensions of y in the equation. And the values of PM will be the roots of the equation arising by substituting for x its particular value AP in any case.

From whence it appears, how, when an equation is given, you may determine as many of the points M as you please, and draw the line that shall pass through all these points; which is called the locus of the equation.

When any equation involving two unknown quantities, x and y, is proposed, then substituting for x any particular value AP, if the equation that arises has all its roots positive, the points M will lie on one side of AE; but if any of them are found negative, then these are to be set off on the other side of AE towards m.

If for x, which is supposed undetermined, you substitute a negative quantity, as Ap, then you will find the points M, m, are taken in, that it may shew all the values of y corresponding to all the possible values of x.

If, in any case, one of the values of y vanish, then the point M coincides with P, and the locus meets with AE in that point.

If one of the values of y becomes infinite, then it shews that the curve has an infinite arch: and in that case the line PM becomes an asymptote to the curve, or touches it at an infinite distance, if AP is itself finite.

If, when x is supposed infinitely great, a value of y vanish, then the curve approaches to AE produced as an asymptote. If any values of y become impossible, then so many points M vanish.

From what has been said it appears, that when an equation is proposed involving two undetermined quantities, x and y, there may be as many intersections of the curve, that is the locus of the equation, and of the line PM, as there are dimensions of y in the equation; and as many intersections of the curve

and

and the line AE as there are dimenſions of x in the equation.

LOCUST, *Locuſta*, a genus of inſects, comprehending the locuſt, ſimply ſo called, the ſeveral ſpecies of other locuſts and graſhoppers, with the crickets of the houſe and field.

Water-LOCUST, *Locuſta Aquatica*, the name given by authors to a ſpecies of water inſect, ſomewhat reſembling the locuſt kind in ſhape. It is about three inches long, its tail an inch and a quarter, and its legs are of different lengths; the anterior pair being ſhorteſt of all. Its body is ſlender, and its fore legs are always carried ſtraight forward, ſo as to reach beyond the head in the form of antennæ. Theſe, as well as the other legs, end each in two claws. The eyes are ſmall and not very prominent, and the upper wings are cruſtaceous, the under ones membranaceous, thin, and tranſparent. The middle joint of the leg is ſuch, that the creature can only move them upwards, not downwards; and there runs an acute tongue or proboſciſs under the belly, as is the caſe of the water ſcorpion and notonecta. *Ray's Hiſt. Inſects.*

LOCUST-TREE, in botony. See the articles HYMENÆA and ROBINIA.

LOCUSTÆ, in botany, the tender extremities of the branches of trees, ſuch as, it is ſuppoſed, St. John Baptiſt fed on in the wilderneſs.

LODGMENT, in military affairs, is a work raiſed with earth, gabions, faſcines, wool-packs, or mantelets, to cover the beſiegers from the enemy's fire, and to prevent their loſing a place which they have gained, and are reſolved, if poſſible, to keep. For this purpoſe, when a lodgment is to be made on the glacis, covert-way, or in a breach, there muſt be great proviſion made of faſcines, ſand-bags, &c. in the trenches; and during the action, the pioneers with faſcines, ſand-bags, &c. ſhould be making the lodgment, in order to form a covering in as advantageous a manner as poſſible from the oppoſite baſtion, or the place moſt to be feared.

LOEFLINGIA, in botany, a genus of plants whoſe flower conſiſts of an upright cup cut into five ſegments, with five ſmall petals: the ſtamina are compoſed of three filaments, topped with double roundiſh antheræ: the fruit is a three-cornered ovate capſule, with one cell, containing a number of ova-to-oblong ſeeds.

LOESELIA, in botany, a genus of plants whoſe flower is monopelous and unequal, cut at the limb into five parts: the fruit is an ovate trilocular capſule, containing a number of angulated ſeeds.

LOG, in the marine, a machine uſed to meaſure the ſhip's way through the ſea.

It is compoſed of three parts, viz. the reel, the line, and a little board formed like the quadrant of a circle, and nearly reſembling the ſhape of thoſe quadrants employed to take the altitude of a tree, ſteeple, or other object. The term Log, however, is more particularly confined to this laſt.

This piece of board is generally from five to ſix inches in the radius, and a quarter of an inch in depth: and round the arching edge of it, is nailed a thin plate of lead, of ſufficient weight to make the log ſwim perpendicularly in the water, and ſo, as that nearly two thirds of it may be immerſed under the ſurface. In the middle of the arch, about a quarter of an inch within the edge, is bored a ſmall hole, and another within the angular point; thro' this laſt is inſerted the end of a piece of line, which being knotted on the other ſide, is drawn tight back to the hole: to the other end of this ſmall cord, which is about two feet long, is faſtened a pin, which is thruſt into the other hole: the log being then ſuſpended horizontally, the line is faſtened to the middle of this ſmall ſtring, ſo that the pin can occaſionally be taken out, and will eaſily come out of itſelf when it meets with any reſiſtance.

The log line, whoſe other end is tied to one of the ſpokes or ſhafts of the reel, is generally from four to ſix hundred feet in length, and is divided into equal ſpaces, which are marked with one, two, three, four knots, &c. the greateſt number being next the reel, and having often ſingle knots between them to determine the half; theſe large ſpaces anſwer to ſo many miles, and the intermediate ones to half miles, and begin from a red rag which is placed at the diſtance of ten, twelve, or fifteen fathoms from the log, in proportion to the height of the ſhip's ſtern.

The diſtance of the knots from each other muſt always be in proportion to the half-minute glaſs, which is turned at the time of throwing the log into the ſea, as the glaſs may run ſlower or faſter than the time it is calculated for, and muſt therefore be often tried by a pendulum, the vibrations of which determine how many ſeconds the glaſs runs.

If the glaſs runs thirty ſeconds, then muſt the diſtance of the knots from each other be 50 feet, if it runs more or leſs, they ought to be corrected in proportion, for,

As thirty ſeconds
Is to fifty feet,
So is the number of ſeconds the glaſs runs
To the length between the knots.

But as the line may often be contracted or lengthened by the moiſture or heat of the weather, it muſt be frequently meaſured and corrected: the glaſs muſt alſo be proved by the pendulum.

Heaving the log is thus performed:

The log-reel, which turns upon an axis or wooden pin about two feet long, and about which the line is wound, is held by one man, and another holds the half-minute glaſs, while the mate of the watch fixes the little pin in the log, and throws it over the ſtern; and as the ſhip ſails, the log ſwimming

ming perpendicular naturally feels a reſiſtance, to prevent which, the mate draws the line quick off the reel, ſo that it makes a ſtraight line in the water, and the log remains nearly in the ſame ſpot where it firſt alighted in the water. The ſpace of line between the log and the red rag, as mentioned above, is to let the log be far enough a-ſtern to be out ofthe ſhip's eddy or wake, and when this red rag goes over the ſtern, the glaſs is turned; and when the glaſs runs out, the man who held it calls *ſtop*; the log-line is then ſtopped, and the log meeting with great reſiſtance, the pin draws out, after which it is eaſily drawn aboard; and the number of knots and fathoms reckoned from the red rag to the place where the line was ſtopped, determines the ſhip's rate of going for an hour: if the wind ſhould freſhen or abate in the intervals, ſo as to make the ſhip go faſter or ſlower than at the time of heaving the log, the officer generally allows for it at the end of the watch. In ſhips of war and India-men, the log is heaved once an hour; and in common merchant-men once in two hours, or twice in the watch.

LOG-BOARD, a ſort of table divided into ſeveral columns, containing the hours of the day and night, the courſes the ſhip has run; the winds, and all the material occurrences that happen in the 24 hours, or from noon to noon, together with the latitude by obſervation. From this table the ſeveral officers of the ſhip copy the materials, and tranſcribe them, with what additions they can recollect or may think neceſſary to remark in their journals after their own manner.

LOG-BOOK, a book into which the above articles are daily copied, together with every thing material that happens to the ſhip, or is obſerved either at ſea or in a harbour. The diviſions or watches of it, conſiſting of four hours each, are ſigned by the lieutenant or commanding officer of the watch in a ſhip of war or Eaſt-India-man. See the articles JOURNAL and WATCH.

LOG-WOOD, or Campeachy-wood, is the wood of a low prickly tree, which grows plentifully about Campeachy, or the bay of Honduras. See CAMPEACHY-WOOD.

Log-wood gives out its colour both to watery and ſpirituous menſtrua, but not readily to either: it requires to be raſped and ground into fine powder, and boiled in ſeveral freſh parcels of the liquors. Rectified ſpirit extracts the colour more eaſily, and from a larger proportion of the wood than water does.

The tinctures both in water and in ſpirit are of a fine red, with an admixture, particularly in the watery one, of a violet or purple. Volatile alkaline ſalts, or ſpirits, incline the colour more to purple: the vegetable and nitrous acids render it pale; the vitriolic and marine acids deepen it.

The watery decoction, wrote with on paper, loſes its redneſs in a few days, and becomes wholly violet. This colour communicates alſo to woollen cloth previouſly prepared by boiling with a ſolution of alum and tartar: the dye is beautiful, but very periſhable. It is often uſed by the dyers, as an ingredient in compound colours, for procuring certain ſhades which are not eaſily hit by other materials.

With chalybeate ſolutions, it ſtrikes a black. Hence it is employed in conjunction with thoſe liquors for ſtaining wood black for picture frames, &c. and with the addition of galls, for dyeing cloth and hats black. The black dyes, in which this wood is an ingredient, have a particular luſtre and ſoftneſs, far beyond thoſe made with galls and vitriol alone: the beauty, however, which it here imparts, is not permanent, any more than its own natural violet dye.

On the ſame principle, it improves alſo the luſtre and blackneſs of writing ink. Ink made with vitriol and galls, does not attain to its full blackneſs till after it has lain ſome time upon the paper: a due addition of log-wood renders it of a deep black as it flows from the pen, eſpecially when vinegar or white-wine is uſed for the menſtruum.

LOGARITHMIC *Curve*, a curve which explains the nature and properties of logarithms, and is delineated in the following manner:

Upon the line A G (plate LXVI. *fig.* 4.) infinitely extended each way, let there be taken A B, B C, C D, D E, E F, &c. towards the right-hand; alſo A O, O P, &c. towards the left, all equal among themſelves; and from the ſeveral points P, O, A, B, C, D, E, F, &c. let there be drawn the lines R P, O Q, A H, B I, C K, D L, E M, F N, &c. equal in length to the ſeveral lines, in the geometrical ſcale of proportional lines, infinite in number; theſe therefore will repreſent ſo many terms in the progreſſional of proportionals, of which the line A H repreſents unity. Now if the extremities R, Q, H, I, K, L, M, N, &c. of the geometrical ſcale of mean proportionals be connected together by right-lines, the figure P R N F will be a polygon, conſiſting of more or fewer ſides, according as the terms in the ſcales of mean proportionals are more or fewer in number.

If the diſtances A B, B C, D E, E F, &c. are biſſected in the points *b*, *c*, *d*, *e*, *f*, &c. and from theſe points be drawn lines, as *b i*, *c k*, *d l*, *e m*, *f n*, &c. perpendicular to A G, which will be ſo many proportionals between A H, B I, C K, D L, E M, F N, &c. there will ariſe a new ſcale for a ſeries of proportionals between A H, B I, C K, D L, E M, F N, &c. double in number to thoſe of the former ſcale. And if the extremities H, *i*, I, *k*, K, *l*, L, &c. be connected together by right-lines, we ſhall have a new polygon, conſiſting of a greater

greater number of ſides; but each ſide leſs in magnitude.

7. After the ſame manner, if the diſtance between every two terms be continually biſſected, and to each of the points ſo found, there be applied a ſeries of mean proportionals, the number of terms in this new ſcale, as alſo the ſides of the polygon, will by this means become infinite; and each ſide of the polygon will be leſs than any given right-line, and conſequently the polygon will be changed into a curve-lined figure; ſince every curvilinear figure may be conſidered as a polygon of an infinite number of ſides. The curve thus deſcribed is called the logarithmic curve, in which, if the right-lines A H, B I, &c. which ſtand at right-angles to the axis A G, repreſent ſo many terms in a ſeries of numbers in geometrical progreſſion, the portions of the axis A B, B G, &c. between the place of unity and any given term, will ſhew the place or order that each number in the ſcale of geometrical proportions obtains from the place of unity in the ſame ſeries.

The diſtance therefore between any two numbers, in this continued ſcale of geometrical proportionals, is the logarithm of the ratio of theſe two numbers the one to the other. See the article LOGARITHMS.

LOGARITHMIC *Spiral.* If the quadrant of a circle A N B (plate LXVI. *fig.* 5.) be divided into any number of equal parts, in the points N, *n*, *n*, &c. and from the radii C N, C *n*, C *n*, &c. be cut off C M, C *m*, C *m*, &c. continual proportionals, the points M, *m*, *m*, *m*, &c. will be in the logarithmic ſpiral. And there may be imagined an infinite number of different curves of this kind.

LOGARITHMS, a ſet of artificial numbers, whereby the common operations in multiplication and diviſion are performed by addition and ſubtraction; raiſing powers and extracting roots, are by the help of theſe numbers eaſily performed by multiplication and diviſion.

The word is formed from the Greek, λογος, ratio, and αριθμος, number.

Logarithms, juſtly eſteemed one of the greateſt and moſt uſeful diſcoveries that the laſt century has produced, were firſt invented by John Neper, baron of Marchiſton, in Scotland, and by him firſt publiſhed at Edinburgh in the year 1614; and ſoon after, by himſelf and Mr. Briggs, (then Savilian profeſſor of geometry in the univerſity of Oxford) reduced into a better form, and publiſhed in London in the year 1624, in the ſame form and manner as they are uſed at this day.

Logarithms may be conſidered as, and are uſually defined to be, a ſeries or rank of numbers in an arithmetical progreſſion, fitted or adapted to the exponents of a ſeries of numbers in a geometrical progreſſion.

If between 1 and x be inſerted a mean proportional, which is $\sqrt{x}$ or $x^{\frac{1}{2}}$, its index $\frac{1}{2}$ ſhews that its diſtance from unity will be but one half of the diſtance of x from unity. In like manner, if between x and x^2 we inſert a mean proportional, its index will be 1 and $\frac{1}{2}$ or $\frac{3}{2}$, inaſmuch as its diſtance from unity is once and a half the diſtance of x from the ſame place of unity.

Again, if between 1 and x be inſerted two mean proportionals, the firſt of theſe will be the cube-root of x or $\sqrt[3]{x}$, and its index will be $\frac{1}{3}$, inaſmuch as its diſtance from the units place is but $\frac{1}{3}$ of the diſtance of x, from the ſame place of unity; and conſequently $\sqrt{x}$ is expreſſed by $x^{\frac{1}{3}}$, whence it follows, that the index of unity is 0, inaſmuch as unity cannot be removed at any diſtance from itſelf.

And the ſame ſeries of geometrical proportionals may be continued on the contrary ſide of unity, or towards the left hand, and which therefore will decreaſe in the ſame manner, or in the ſame ratio, as the terms placed on the right hand increaſe.

For the terms $\frac{1}{x^5}$, $\frac{1}{x^4}$, $\frac{1}{x^3}$, $\frac{1}{x^2}$, $\frac{1}{x}$, 1, x, x^2, x^3, x^4, x^5, &c. are in the ſame geometrical progreſſion continued, and have all the ſame common ratio; wherefore, inaſmuch as the diſtance of x from unity towards the right hand is poſitive, or $+1$, the diſtance of $\frac{1}{x}$ from unity towards the left hand, which is equal to the former, is negative or -1, which is therefore the index of $\frac{1}{x}$, and conſequently for $\frac{1}{x}$ may be written x^{-1}.

Again, inaſmuch as x^2 is on the right ſide of unity, and poſitive, and its index $+2$, the index of $\frac{1}{x^2}$, which is as far diſtant from unity on the contrary ſide, or towards the left hand, will be negative, and -2, and conſequently $\frac{1}{x^2}$ is the ſame with x^{-2}: In like manner x^{-3} is the ſame with $\frac{1}{x^3}$, and x^{-4} the ſame with $\frac{1}{x^4}$; whence it comes to paſs that the negative indices ſhew that the terms to which they belong, are as far diſtant from unity toward the left hand, as the term whoſe indices are the ſame and poſitive, are removed from unity on the contrary ſide, or towards the right hand.

Again, as between 1 and x, in the ſeries increaſing from or on the right hand of unity, may be inſerted a mean proportional, as $\sqrt{x}$, and between this mean proportional and unity be inſerted another mean proportional, as $\sqrt[4]{x}$, and between the laſt mean proportional and unity be inſerted another

mean proportional, as $\sqrt[8]{x}$, &c. whose respective indices will be $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, &c. so between unity and the next term $\frac{1}{x}$ in the series decreasing from unity, or on the left hand of unity, may be inserted a mean proportional, as $\frac{1}{\sqrt{x}}$, whose correspondent index will be $-\frac{1}{2}$: and, again, between this mean proportional and unity, may another mean proportional, as $\frac{1}{\sqrt[4]{x}}$, be inserted, whose correspondent index will be $-\frac{1}{4}$, and between this and unity may another mean proportional be inserted; the index will be $-\frac{1}{8}$, &c. and as this may be done between any other two terms of the progression, it follows, that between any two terms may an infinite number of mean proportionals be inserted, whose respective indices will become the logarithms of the respective terms to which they belong: and these mean proportionals, the greater they are in number between the two terms of any ratio, the nearer do they approach to a ratio of equality, with their correspondent indices or exponents.

Hence we are let into the reason of the ancient way of making logarithms, and which was made use of by their first inventors, and that was by a continual extraction of the square-root. In order to this, they first extracted the square of 10, and having continued that root to a very great number of places, they extracted the square-root again, and so on continually, until they at last, after 54 such extractions, obtained the number 1,000000000000 00012781914932003234 42. Now if this number be first squared, then cubed, then raised to the fourth, fifth, &c. power, it is very certain that, as their increase in their several products arise but by slow degrees, there will among them be found such as are extremely near in value to the natural numbers 2, 3, 4, 5, &c. and consequently, by what has been already said concerning the nature of logarithms, those of the natural numbers 2, 3, 4, 5, &c. will be expounded by the exponents, or number of multiplications, which formed the products respectively equal (or nearly so) to the natural numbers 2, 3, 4, 5, 6, &c. Here we see the reason why the logarithm of 1 is 0, or rather, that 1 has no logarithm, because the quantity to be continually involved must be a small matter greater than 1; for if it be less, the powers will decrease it.

If logarithms are to be made only to seven places of figures, which are sufficient for common use, twenty-five successive extractions will do for that purpose; that is, we need only extract the 33554432 (or 2 raised to the 25th power) root of 10; because in that root there will be found seven cyphers before the first significant figure after the unit; and in the course of these extractions, the denominators of the fractions expounding those roots which are nearest in value to any of the natural numbers 2, 3, 4, 5, &c. will point out their respective logarithms.

Some have considered the logarithm of a number as the logarithm of the ratio of unity to that number itself, or as the distance between unity and that number in a geometrical scale of proportionals, and consequently measured by the number of proportionals contained between them: logarithms therefore expound the place or order that every number obtains from the unit's place in a continued series or scale of proportionals indefinite in number.

Thus, if between unity, and the number 10, there be supposed 10000000, &c. mean proportionals, that is, if the number 10 be placed in the 10000000th place from unity, between 1 and 2, there will be found 3010300 of such proportionals; that is, the number 2 will be placed in the 3010300th place from unity; between 1 and 3 there will be found 4771213 of the same proportionals, or the number 3 will stand in the 4771213th place in the indefinite scale of proportionals; their numbers 10000000, 3010300, and 4771213, are therefore the logarithms of 10, 2, and 3; or, more properly, the logarithms of the ratios of those numbers one to the other.

Again, if between unity and the number 10, there be supposed an indefinite scale of mean proportionals, whose number is 23025851; that is, if the number 10 be placed in the 23025851st place from unity, in the indefinite scale of proportionals, between 1 and 2, there will be found to be 6931471 such mean proportionals; and between 1 and 3, there will be found 10986122 of the same proportionals: so that if the first term of the series be called x, the second term will be x^2, the third x^3, &c. and if the number 10 be supposed to be the 10000000th term in the series, the number 2 will be the 3010300th term, and the number 3 will be the 4771213th term in the same series; and consequently $x^{10000000} = 10$, $x^{3010300} = 2$, and $x^{4771213} = 3$, &c. and again, if the number 10 be supposed the 23025851st term in the series, the number 2 will be the 6931471st term, and the number 3 the 10986122d term in the same series; and consequently, in this case, $x^{23025851} = 10$, $x^{6931471} = 2$, and $x^{10986122} = 3$, &c.

And as the indefinite number of mean proportionals between any two numbers may be assumed at pleasure, hence logarithms may be of as many different forms (that is, there may be as many different scales of logarithms) as there can be assumed different scales of mean proportionals between any two numbers. Every number therefore is some certain power of that number which is placed next to unity in the indefinite scale of proportionals between unity and the given number, and the index of that power is the logarithm of the number.

Logarithms therefore may be of as many sorts as you

you can assume different indices of the power of that number whose logarithm is required.

But since fluxions and the higher geometry have been so well understood, mathematicians have directed their views towards facilitating those laborious and operose calculations formerly made use of for constructing tables of logarithms, by help of converging series, and other means, whereby the logarithms of any proposed numbers may now be obtained with very little trouble: an example of this kind may be seen in Mac Laurin's Fluxions, p. 678, vol. ii. where that celebrated mathematician shews that, the logarithm of m being given, the logarithm of $m+z$ — log. m is equal to $\frac{2z}{2m \times z}$ multiplied by the series $1 - \frac{z}{12} \times \frac{1}{m+z} - \frac{1}{m} + \frac{z^3}{360} \times \frac{1}{\overline{m+z}^3} - \frac{1}{m^3} - \frac{z^5}{1260} \times \frac{1}{\overline{m+z}^5} - \frac{1}{m^5}$ + &c. This series converges so very swift, that two or three terms are sufficient in almost any case whatsoever.

The indices, or characteristics of logarithms, correspond to the denominative part of the natural numbers, as the other member of the logarithm does to the denominative part of the number: that is, the index shews the denomination, or place of the last (or left hand) figure of the number, and consequently of all the rest. — Thus 0, affixed to a logarithm, denotes the last figure of the number, to which the logarithm answers, to be nothing distant from (i. e. in) the place of units. The index 1 shews the last figure of its number to distant 1 place from the place of units, i. e. to be in the place of tens, and consequently the numnumber itself te be either 10, or some number between that and 100, and so of the other indices. Hence all numbers, which have the same denomination, but not the same numerative parts, are all numbers from 1 to 10, from 10 to 1000, &c. and will have logarithms whose indices are the same, but the other members different. Again, all numbers, which have the same numerative, but not the same denominative part, will have different indices, but the rest of the logarithms the same. If a number be purely decimal, to its logarithm is affixed a negative index, shewing the distance of its first real figure, from the place of units. Thus the logarithm of the decimal ,256 is $\bar{1}$,43824; of the decimal ,0256 is $\bar{2}$,30824, &c.

To find the logarithm for a number greater than any in the common tables, but less than 10000000.— Cut off four figures on the left hand of the given number, and seek the logarithm in the table; add as many units to the index, as there are figures remaining on the right; subtract the logarithm found, from the next following it, in the table; then, as the difference of numbers in the canon is to the tabular difference of the logarithms answering to them, so are the remaining figures of the given number to the logarithmic difference; which, if it be added to the logarithm before found, the sum will be the logarithm required. Suppose the logarithm of the number 92375 were required. Cut off the four figures 9237, and to the characteristic of the logarithm corresponding to them, add an unit; then,

From the logarith. of the numb. 9238	= 3,9655780
Subtract logarith. numb. — 9237	= 3,9655309
Remains tabular difference — — —	471

10—471—5
5) 2 — — 1
235

Now to the logarithm — — — —	4,9655309
Add the difference found — — — —	235
The sum is the logarithm required —	4,9655544

To find the logarithm of a proper fraction.—Subtract the logarithm of the numerator from that of the denominator, and to the remainder prefix the sign of subtraction.—Thus, suppose it were required to find the logarithm of $\frac{3}{7}$,

Logarithm of 7	= 0,8450980
Logarithm of 3	= 0,4771213
Logarithm of $\frac{3}{7}$	= $\bar{0}$,3679767

To find the number corresponding to a logarithm greater than any in the table.—First, from the given logarithm, subtract the logarithm of 10, or 100, or 1000, or 10000, till you have a logarithm that will come within the compass of the table; find the number corresponding to this, and multiply it by 10, or 100, or 1000, or 10000, the product is the number required. Suppose, for instance, the number corresponding to the logarithm 7,7589982 be required; subtract the logarithm of the number 10000, which is 4,0000000, from 7,5589982; the remainder is 3,7589982, the number corresponding to which is 5741,1, which, multiplied by 10000, gives 57411000, the number required.

To find the number corresponding to a negative logarithm.—To the given negative logarithm, add the last logarithm of the table, or that of the number 10000, i. e. subtract the first from the second, and find the number corresponding to the remainder; this will be the numerator of the fraction, whose denominator will be 10000. Suppose it be required to find the fraction corresponding to the negative logarithm 0,3679767, subtract this from the remainder is 3,6320233, the number corresponding to which is $4285\frac{71}{100}$; the fraction sought therefore is $\frac{4285}{10000}$.—The reason of the rule is, that as a fraction is the quotient, arising from the division of the numerator by the denominator, unity will be to the fraction, as the denominator to the numerator; but as unity is to the fraction corresponding

4,0000000

ing to the given negative logarithm, ſo is 10000 to the number correſponding to the remainder: therefore if 10000 be taken for the denominator, the number will be the numerator of the fraction required.

To find a fourth proportional to three given numbers, add the logarithm of the ſecond to that of the third, and from the ſum ſubtract the logarithm of the firſt; the remainder is the logarithm of the fourth required. Let the given numbers be 4, 68, and 3.

Logarithm	68=1,8325089
Logarithm	3=0,4771213
Sum — —	=2,3096302
Logarithm —	4=0,6020600
Logarithm required	1,7075732

The number in the tables correſponding to which is 51.

LOGIC, λογικη, the art of thinking and reaſoning juſtly; or, it may be defined, the ſcience or hiſtory of the human mind, inaſmuch as it traces the progreſs of our knowledge from our firſt and moſt ſimple ideas through all their different combinations, conceptions, and all thoſe numerous deduction that reſult from variouſly comparing them one with another. See the articles IDEA and KNOWLEDGE.

The preciſe buſineſs of logic, therefore, is to explain the nature of the human mind, and the proper manner of conducting its ſeveral powers, in order to the attainment of truth and knowledge. It lays open thoſe errors and miſtakes we are apt, through inattention, to run into; and teaches how to diſtinguiſh between truth, and what only carries the appearance of it. By this means, we grow acquainted with the nature and force of the underſtanding; ſee what things lie within its reach; where we may attain certainty and demonſtration; and when we muſt be contented with probability.

Theſe conſiderations ſufficiently evince the uſefulneſs of this ſcience, which is divided into four parts, according to the number of the operations of the mind in its ſearch after knowledge, viz. perception, judgment, reaſoning, and method. See the articles PERCEPTION, &c.

This valuable art of ranging our ideas, connecting them cloſely together, and conſequently of facilitating the tranſition from one to another, ſupplies us with a means of rendering all men's abilities nearly equal. In fact, all our knowledge is reducible to primative ſenſations, which is nearly alike in all men. The art of combining and connecting our direct ideas, only gives them a more or leſs exact arrangement and denomination; whence they become more or leſs ſenſible to others. A man, who readily combines his ideas, differs but little from him who combines them ſlowly; as he who judges of a picture at ſight, differs but little from him who requires to be made ſenſible of all its parts; both, at the firſt glance, have the ſame ſenſations, though they ſink not ſo deep in the ſecond, who therefore dwells longer upon each, to render them ſtrong and diſtinct; and by this means, the reflex ideas of the firſt obſerver become as eaſy to the ſecond as direct ones. And hence, perhaps, there is ſcarce an art or ſcience that may not, by means of a well adapted logic, be taught to a ſlow underſtanding; becauſe there are few arts or ſciences, whoſe precepts or rules may not be reduced to ſimple notions, and diſpoſed in ſo connected an order, that the chain need never be broken. As the mind is more or leſs ſlow in its operations, it requires more or leſs of this connected order. The advantage of a genius is that of having leſs occaſion for it; or rather, of being able to form it quick, and almoſt imperceptibly. See DEMONSTRATION.

LOGISTIC CURVE, the ſame with that otherwiſe called logarithmic. See the article LOGARITHMIC.

LOGISTIC SPIRAL. See LOGARITHMIC and SPIRAL.

LOGISTICA NUMERALIS, the ſame with algorithm. See ALGORITHM.

LOGISTICAL ARITHMETIC, the doctrine of ſexageſimal fractions. See the article SEXAGESIMAL.

LOHOCH, or LOCH, in pharmacy, a compoſition of a middle conſiſtence between a ſoft electuary and a ſyrup, principally uſed in diſorders of the lungs. See LINCTUS.

LOINS, *Lumbi*, in anatomy, the two lateral parts of the umbilical region of the abdomen. See the article ABDOMEN.

LODIUM, darnel, in botany, a genus of plants, the corolla whereof conſiſts of two valves; the lower is narrow, lanceolated, convoluted, acuminated, and of the length of the cup; the other is ſhort, linear, obtuſe, and hollowed upwards: there is no pericarpium; the corolla incloſes the ſeed, which is ſingle, oblong, compreſſed, convex on one ſide, and plane and ſulcated in the middle on the other.

The ſeed of this plant is reckoned attenuant, abſtergent, drying, and heating.

LONCHITIS, ſpleenwort, in botany, a genus of cryptogamious plants of the fern kind, the fructifications of which are diſpoſed in ſmall lines, ſeparately under the ſinuſes of the leaves, and arranged into lunulated ſeries. It grows wild in divers parts of England.

The leaves are of uſe for healing wounds, and in preventing inflammations of them; they are alſo uſed againſt the ſpleen; the root is aperient and diuretic.

LONDON-PRIDE, the Engliſh name for a ſpecies of ſaxifrage. See the article SAXIFRAGE.

LONGÆ-

LONGÆVITY, from *longus*, long, and *vita*, life, length of life.

We have ſeveral inſtances of longævity, as Parr, who lived one hundred and thirty-two years and nine months; Henry Jenkens, of Yorkſhire, who lived one hundred and ſixty-nine; the counteſs of Deſmond, and Mr. Eccleſtone, both of Ireland, each of whom exceeded one hundred and forty years.

LONG-BOAT, in the marine, the largeſt and ſtrongeſt boat in the ſhip.

The uſe of the long-boat is to carry great bins, ſuch as water, proviſions, anchors, and cables, and often part of the cargo: ſhe is occaſionally equipped with a maſt, ſails, and rigging, ſometimes armed with ſwivels, muſquetoons, and carabines, and can be decked as neceſſity requires.

LONGIMETRY, the art of meaſuring lengths, acceſſible and inacceſſible.

LONGISSIMUS DORSI, in anatomy, a very complex, long, and narrow muſcle, ſituated between the ſpinal apophyſes, and the ſacro-lumbaris, from which it is divided by a fatty or cellular line; but, at the lower part, they are confounded together. It covers the ſemiſpinalis, or tranſverſo-ſpinalis dorſi, and ſemiſpinalis lumborum. Its upper part lies between the ſacro-lumbaris and tranſverſalis colli. This muſcle and the ſacro-lumbaris are common to the back and loins. The longiſſimus dorſi is an aſſiſtant to the ſacro-lumbaris, eſpecially its vertebral portion, which it helps very powerfully both by the multiplicity and inſertions of its fibres, in ſuſtaining the vertebræ of the back and loins, while extended, whether in ſitting or ſtanding, and in preventing their ſinking under the weight of the body, or any additional burden. It aſſiſts in performing, or counterballancing all the motions and inflections which theſe vertebræ, eſpecially thoſe of the loins, are capable of in all poſtures of the body. And in this, it alſo bears ſome reſemblance to the inferior or vertebral portion of the ſplenius: and theſe two muſcles on each ſide, and the ſacro-lumbaris, are of the number of thoſe called vertebrales obliquæ divergentes. *Winſlow's Anat.*

LONGITUDE *of the Earth*, denotes its extent from weſt to eaſt, according to the direction of the equator.

LONGITUDE *of a Star*, &c. in aſtronomy, an arch of the ecliptic, counted from the beginning of Aries, to the place where a ſtar's circle of longitude cuts the ecliptic.

LONGITUDE *of a Place*, in geography, its diſtance from ſome firſt meridian, or an arch of the equator intercepted between the meridian of the place and the firſt meridian.

LONGITUDE, in navigation, the diſtance of a ſhip or place, eaſt or weſt, from one another, counted in degrees of the equator. If this diſtance be counted in leagues, miles, &c. or in degrees of the meridian, and not in thoſe proper to the parallel of latitude, it is uſually called departure.

Since the difference of longitude between any two places is equal to the arch of the equator intercepted between the two meridians paſſing through the two places; which is analogous to the quantity of time that the ſun requires to move from the meridian of one place to that of another; or, in the language of the Copernicans, that is elapſed between the application of the meridian of one of the places to the ſun and the meridian of the other; for, ſince the ſun finiſhes his diurnal revolution in the ſpace of 24 hours, or, which is the ſame thing, ſince the revolution of the earth about her axis is performed in the ſame time, it follows, that in every hour there paſſes over the meridian one-twenty-fourth part of 360 degrees, or of the whole circumference of the equator, equal to fifteen degrees; in two hours, one-twelfth part, or thirty degrees; and, in any greater or leſſer part of time, a proportional greater or leſſer part of the equator; whence it follows, that if the difference of longitude, or arch of the equator intercepted between the meridians paſſing through any two places, be known, the difference of the times of the day in thoſe two places is known alſo; and, conſequently, the hour in one place being known, the hour in the other place is known alſo; and, on the contrary, if the difference between the times at any two places be known, the difference of longitude between thoſe two places is known alſo, by reducing the difference of the times into degrees and minutes, allowing fifteen degrees to an hour, &c.

Hence it is, that if two or more places lie under the ſame meridian, the hour in one will be the ſame with the hour in the other; and, on the contrary, if in two or more places the hour be the ſame, thoſe places lie under the ſame meridian.

And, becauſe the ſun in all places conſtantly riſes in the eaſt, he muſt neceſſarily apply himſelf to the meridian of the eaſtermoſt place firſt, and, conſequently, in that place that lies to the eaſtermoſt, the noon happens ſooneſt; and the hour of the day or diſtance of the ſun from the meridian at any other time muſt be greateſt.

Whence it appears, that if, by any contrivance whatſoever, the hour of the day at the ſame point of abſolute time in two different places can be obtained, the difference of longitude between thoſe places is alſo known; and by comparing the times together, it is eaſy to pronounce which place of the two lies to the eaſtward or weſtward of the other.

Wherefore if two or more perſons can view the ſame appearance at two or more places, and pronounce the time at each place when ſuch appearance was viſible; or if the time when any notable appearance ſhall happen at any place be predicted, and the time when that appearance was viſible at any other place was determined; theſe times being compared together, will give the difference of meridian,

ridians, or difference of longitude between the two places.

Now ſince an eclipſe of the moon proceeds from nothing elſe but an interception of the earth between her and the ſun, by which means ſhe is prevented from reflecting the light ſhe receives from the ſun, the moment that any part of her body begins to be deprived of the ſolar rays, it is viſible to all thoſe people who can ſee her at the ſame time; whence if two or more different people, at two or more different places, obſerve the times when it firſt began or ended, or note the time when any number of digits was eclipſed, or when the ſhadow begins to cover or quit any remarkable ſpot, the difference of thoſe times, if there be any, when compared together, will give the difference of longitude between the places of obſervation.

The longitudes of places may alſo be determined from the obſervations of ſolar eclipſes; but theſe being incumbered with the conſiderations of parallaxes, are not near ſo proper as thoſe of the moon are; and each of theſe happening but rarely, another excellent expedient has been thought of, and that is the eclipſes of Jupiter's ſatellites.

Jupiter has been found to have four ſatellites or moons conſtantly attending him, always obſerving the ſame laws in moving round about him. See the article JUPITER.

Now as neither Jupiter nor any of his attendants have any native light of their own, but ſhine with a borrowed light from the ſun, it happens that each of theſe, in every revolution about Jupiter, ſuffers two eclipſes, one at their entrance into the ſhadow, the other at the entrance of their paſſage behind his body; whence in each revolution of the ſatellite there are four remarkable appearances, by the obſervation of any one of which the buſineſs may be done, viz. one at the entrance into the ſhadow, and one at the emerſion out of it; one at the entrance behind the body, and another at the coming out; but the latter of theſe, viz. the ingreſs and egreſs of the ſatellite, into and from under the body, is not ſo much regarded by aſtronomers as the immerſion into and out of the ſhadow, becauſe in the former, the difficulty of pronouncing the exact time is very great, it requiring, in each obſerver, eyes equally good and ſtrong, and teleſcopes equally large; but the obſervation of the former of theſe, viz. the immerſion into, and emerſion out of the ſhadow, is eaſy and practicable, becauſe the quick motions of the ſatellites plunge them ſo quick into the ſhadow of Jupiter, that is no difficult matter to pronounce, by any teleſcope, by which they may be ſeen, the exact time of their immerſion and emerſion, as any one may ſoon be ſatisfied, if he will but try the experiment.

Now, inaſmuch as each of theſe happens at the ſame moment of abſolute time, if two or more perſons in different places note the time of obſervation, theſe, when compared together, will give the difference of longitude between the two places of obſervation. And, when we conſider the great number of theſe eclipſes that happen every year, there being more viſible in one year than there are days in it, and, conſequently, but few nights when Jupiter may be ſeen, and which is near eleven months of the year, but that an eclipſe of one or other happens, and ſometimes two or three in a night; the eaſineſs with which they may be made, there requiring only a teleſcope of eight or ten feet in length, which may be almoſt managed with the hand; and the little likelihood there is of miſſing the times of ingreſs or egreſs, they being in a manner momentaneous; and laſtly, the great exactneſs to which they would give the difference of longitude, it being certainly as exact as the latitude can at preſent be taken; it is much to be wondered at, that the more ſkilful part of our ſeamen have ſo long neglected them, and eſpecially in the ſeveral ports into which they ſail.

Beſides theſe, there is another method equally uſeful, expeditious, and certain; and that is, the appulſes of the moon to certain fixed ſtars, and their occultations by the interpoſition of her body; for, the moon finiſhing her revolution in the ſpace of twenty-ſeven days, ſeven hours, forty-three minutes, there are but few clear nights, when the moon does not paſs over, or ſo near to ſome fixed ſtar, that her diſtance from it, or the time of her viſible conjuction with it, may be eaſily obſerved by the teleſcope and micrometer only; and theſe when compared together or with the viſible time computed to the meridian of ſome place when a good theory of the moon ſhall be obtained, will ſhew the difference of longitude of thoſe places.

The lunar theory is already brought to very great perfection, and the Nautical Ephemerides, now preparing by that able mathematician Mr. George Witchel, will, it is hoped, render the method of finding the longitude at ſea very practicable; eſpecially as the ingenious Mr. Maſkeline has already favoured the world with a treatiſe called the Britiſh Mariner's Guide, wherein he has fully explained the method of finding the longitude from obſervations made on the appulſes of the moon to the fixed ſtars.

Mr. Flamſtead has given us the places of near one thouſand fixed ſtars, confirmed by ſeveral obſervations, that lie within the zodiac, each of which will be covered by the moon and the reſt of the planets, in one revolution of their node; ſo that ſcarce one night can happen but ſome one or other of them will be eclipſed, or approached ſo near unto, as to come within the compaſs of a teleſcope, in one place of the earth or other: add to theſe the eclipſes of Jupiter's ſatellites, and it is ſcarce poſſible that any clear night can happen,

but

but the heavens afford us ſome agreeable phænomenon or other, by which the longitude of any place may be duly aſcertained.

In the Philoſophical Tranſactions, N° 1, we have an account of a ſucceſsful experiment made with two pendulum-watches by major Holmes, in a voyage from the coaſt of Guinea home-wards. This and ſome other ſucceſſeſs encouraged monſieur Huygens ſo far, that, after he had improved the ſtructure of theſe watches, he publiſhed an account at large for ſhewing how and in what manner theſe watches are to be uſed in finding the longitude at ſea, with directions for adjuſting of them and keeping a journal by them; which account the curious reader may ſee at large in the Philoſophical Tranſactions N° 47.

This method has been purſued by the ingenious Mr. John Harriſon, who, after many years labour, has at laſt completed a time-keeper, which has every requiſite neceſſary for finding the longitude at ſea; and from ſeveral experiments, particularly two voyages to the Weſt-Indies, it was found to keep time ſo very accurately as not to vary above a minute in the whole voyage: and he has accordingly received 10,000l. being half the ſtipulated reward for this diſcovery; and will it is preſumed, receive the other moiety as ſoon as his watch ſhall be found to keep time with the ſame degree of accuracy, in the frozen zone. The reader will therefore be pleaſed with finding ſome account of this ingenous contrivance, which we ſhall give from a report delivered to the board of longitude, by Mr. William Ludlam, one of the gentlemen to whom Mr. Harriſon was referred to make a diſcovery of the principles of his time piece.

"The defects in common watches, ſays Mr. Ludlam, which Mr. Harriſon propoſes to remedy, are the following.

"1. That the main-ſpring acts not conſtantly with the ſame force upon the wheels, and through them upon the balance. 2. That the balance, either urged with an unequal force, or meeting with a different reſiſtance from the air or the oil, or the friction, vibrates through a greater or leſs arch. 3. That theſe unequal vibrations are not performed in equal times. 4. That the force of the balance-ſpring is altered by a change of heat.

"To remedy the firſt defect, Mr. Harriſon has contrived, that his watch ſhall be moved by a very tender ſpring, which never unroals itſelf more than one eight part of a turn, and acts upon the balance through one wheel only. But ſuch a ſpring cannot keep the watch in motion a long time. He has therefore joined another, whoſe office is to wind up the firſt ſpring eight times in every minute, and which is itſelf wound up but once in a day.

"To remedy the ſecond defect, Mr. Harriſon uſes a much ſtronger balance-ſpring than in a common watch. For if the force of this ſpring upon the balance remains the ſame, whilſt the force of the other varies, the errors ariſing from that variation will be the leſs, as the fixed force is the greater. But a ſtronger ſpring will require either a heavier or a larger balance. A heavier balance would have a greater friction. Mr. Harriſon therefore increaſes the diameter of it. In a common watch it is under an inch, in this of Mr. Harriſon's two inches and two tenths.

"Had theſe remedies been perfect, it would have been unneceſſary to conſider the defects of the third ſort. But the methods already deſcribed only leſſening the errors, not removing them, Mr. Harriſon uſes two ways to make the times of the vibrations equal, though the arches may be unequal. One is to place a pin, ſo that the balance-ſpring, preſſing againſt it, has its force increaſed; but increaſed leſs when the vibrations are larger; the other to give the palates ſuch a ſhape, that the wheels preſs them with leſs advantage, when the vibrations are larger.

"To remedy the laſt defect, Mr. Harriſon uſes a bar compounded of two thin plates of braſs and ſteel, about two inches in length, rivitted in ſeveral places together, faſtened at one end, and having two pins at the other, between which the balance ſpring paſſes. If this bar be ſtrait in temperate weather, braſs changing its length by heat more than ſteel, the braſs ſide becomes convex when it is heated; and the ſteel ſide when it is cold: and thus the pins lay hold of a different part of the ſpring in different degrees of heat, and lengthen or ſhorten it, as the regulator does in a common watch.

"The two firſt of theſe improvments, any good workman who ſhould be permitted to view and take to pieces Mr. Harriſon's watch, and be acquainted with the tools he uſes, and the directions he has given, could, without doubt, exactly imitate. He could alſo make the palates of the ſhape propoſed; but for the other improvements, Mr. Harriſon has given no rules. He ſays, that he adjuſted thoſe parts by repeated trials, and that he knows no other method. This ſeems to require patience and perſeverance; but with theſe qualifications other workmen need not deſpair of ſucceſs equal to Mr. Harriſon's. There is no reaſon to ſuſpect that Mr. Harriſon has concealed from us any part of his art.

"If our opinion of the excellence and uſefulneſs of this machine be aſked, I muſt fairly own, that nothing but experience can determine the uſe of it with certainty; however, I think it my duty, ſays the above gentleman, to declare to the board the beſt judgment I can form.

"The firſt of Mr. Harriſon's alterations is, I believe, an improvement, but not very conſiderable. Probably if the other defects in common watches could be removed, the changes in the force of the main-

main-ſpring would not occaſion ſuch errors as would make them uſeleſs at ſea.

"The next alteration ſeems to be of greater importance; I ſuppoſe it contributes more to the exactneſs of the watch, than all the other changes put together; but is attended with ſome inconvenience. The watch is liable to be diſordered, and even ſtopped by almoſt any ſudden motion, and, when ſtopped, does not move again of itſelf. But as it has gone two voyages without any ſuch accident, it may ſeem that this danger at ſea is not conſiderable.

"The principal on which Mr. Harriſon forms the alterations of the third ſort is, that the longer vibrations of a balance moved by the ſame ſpring, are performed in leſs time. This is contrary to the received opinion among the philoſophers and workmen. But if Mr. Harriſon is right, yet whether the method he has propoſed will correct the errors, or not, is to me quite uncertain.

"The laſt alteration beforementioned is ingenious and uſeful; but that it can be made to anſwer exactly to the different degrees of heat, ſeems not probable."

LONGITUDE *of Motion*, according to ſome philoſophers, is the diſtance which the center of any moving body runs through, as it moves on in a right line. See the article MOTION.

LONGITUDINAL, in general, denotes ſomething placed lengthwiſe: thus ſome of the fibres of the veſſels in the human body are placed longitudinally, others tranſverſely, or acroſs.

LONICERA, honey-ſuckle, in botany, a genus of plants, the corrolla of which is monopetalous and tubulous, the tube is oblong and gibbous; the limb is divided into five parts, one of which is more deeply cut than the reſt, the ſtamina are five ſubulated filaments top'd with oblong antheræ; the fruit is a roundiſh umbilicated berry, having two cells containing roundiſh compreſſed ſeeds. This genus includes the caprifolium, periclymenum, chamæceraſſus and xyloſteum of Tournefort, and the ſymphoricarpos of Dillenius.

LOOF, in ſhip-building, that part of a ſhip where the bow begins, or where the planks of her fore part begin to bend, and round inward as ſhe grows narrower approaching the ſtem. See BOW.

LOOKING-GLASSES are nothing but plane mirrors of glaſs; which being impervious to the light, reflect the images of things placed before them; for the theory of which ſee the articles MIRROR and REFLECTION.

For the caſting, grinding, and poliſhing glaſſes, ſee the article GLASS.

For foliating of looking glaſſes, ſee the article FOLIATING.

LOOM, a frame compoſed of a variety of parts, uſed in all the branches of weaving; for a particular deſcription of which, ſee WEAVING.

LOOMING, in the ſea-language, appearance, as the ſhip looms large, i. e. appears towering.

LOOP, in the iron works, denotes a part of a ſow, or block of caſt iron, broken or melted off from the reſt.

LOOSE-STRIFE, in botany. See LYSIMACHIA.

LOPPING, among gardeners, the cutting off the ſide branches of trees.

It is very obſervable that moſt old trees are hollow within; which does not proceed from the nature of the trees, but is the fault of thoſe who have the management of them, who ſuffer the tops to grow large before they lop them; as the aſh, elm, hornbeam, &c. and perſuade themſelves, that they may have the more great wood; but in the mean time, do not conſider that the cutting off great tops endangers the life of a tree; or, at beſt wounds it ſo, that many trees yearly decay more in their bodies than the yearly tops come to; and at the ſame time that they furniſh themſelves with more great wood, they do it at the loſs of the owner. And, indeed, though the hornbeam and elm will bear great tops, when the body is little more than a ſhell; yet the aſh, if it comes to take wet at the head, very rarely bears more top after the body of the tree decays. Therefore, if once theſe trees decay much in the middle, they will be worth little but for the fire; ſo that if you find a timber-tree decay it ſhould be cut down in time that the timber be not loſt.

The lopping of young trees, that is, at ten or twelve years old at moſt, will preſerve them much longer, and will occaſion the ſhoots to grow more into wood in one year, than they do in old tops at two or three. Great boughs, ill taken off, ſpoil many a tree; for which reaſon they ſhould always be taken off cloſe and ſmooth, and not parallel to the horizon; and cover the wound with loam and horſe-dung mixed, to prevent the wet from entering into the body of the tree.

When trees are at their full growth, there are ſeveral ſigns of their decay; as the withering or dying of many of their top branches; or if the wet enters at any knot; or they are any wiſe hollow or diſcoloured; if they make but poor ſhoots; or if woodpeckers make any hole in them.

This lopping of trees is only to be underſtood for pollard trees; becauſe nothing is more injurious to the growth of timber-trees, than that of lopping or cutting off great branches from them. Whoever will be at the trouble of trying the experiment upon two trees of equal age and ſize, growing near each other, to lop or cut off the ſide branches from one of them, and ſuffer all the branches to grow upon the other, will in a few years, find the latter to exceed the other in growth every way; and this will not decay near ſo ſoon.

All

All ſorts of reſinous trees, or ſuch as abound with a milky juice, ſhould be lopped very ſparingly; for they are ſubject to decay when often cut. The beſt ſeaſon for lopping theſe trees is ſoon after Bartholomew-tide; at which time they ſeldom bleed much, and the wouud is commonly healed over before the cold weather comes on. *Miller's Gard. Dict.*

The generality of the world are againſt pruning timber trees at all, and, where they naturally grow ſtraight and regular, it is much better let alone. But all common faults in ſhape may be regulated by this lopping them while young, and it can be attended with no ill conſequence to the timber; for the cut not lying near the timber pith cannot affect it, when grown up, and ſquared in the working for beams and other uſes, or to be quartered; for all the defects occaſioned by ſuch wounds, are in the ſuperficial parts, and all the four quarters are perfectly ſound within.

As to the large foreſt trees, they ſhould not be lopped at all, except in caſes of great neceſſity, and then the large boughs muſt not be cut, but only the ſide branches; and even theſe muſt be cut off cloſe, that the bark may ſoon cover the wound, and yet a little ſlanting, that the water may run off, not lodge upon the cut part.

If there is a neceſſity of cutting off a large bough, as by its being broken or cankered, let it be cut off ſlanting at about four feet diſtance from the body of the tree, and that if poſſible near ſome place where there is a young ſhoot from it, which may receive the ſap, and grow up in its place. No ſtump muſt be left ſtanding out farther than this, becauſe they are wounded parts which never can heel, and which will always be letting in the water, and will ſerve as pipes to convey that water into the heart of the body of the tree, and by degrees will utterly ſpoil it. All that grow upright, whether they be large or ſmall branches, muſt in cutting be taken off ſlanting, never evenly, for the ſame reaſon; thoſe boughs that bear from the head are to be cut with the ſlope on the lower ſide, and on any occaſion that great wounds are given to a tree, they ſhould be covered with a mixture of clay and horſe dung, which will make them heal much ſooner than they otherwiſe would do. *Mortimer's Huſbandry.*

LORD, a title of honour given to thoſe who are noble, either by birth or creation; in this ſenſe it amounts to much the ſame as peer of the realm, or lord of parliament. This title, by the courteſy of England, is alſo given to all the ſons of dukes and marquiſes, and to the eldeſt ſons of earls: and it is alſo a title of honour beſtowed on thoſe who are honourable by their employments, as lord advocate, lord chamberlain, lord chancellor, &c.

LORICATION, COATING, in chemiſtry, is the covering a glaſs or earthen veſſel with a coat or cruſt of a matter able to reſiſt the heat, to prevent its breaking in the performing an operation that requires violence of fire.

LOTION, *Lotio*, waſhing, in phyſic, a ſort of medicine compounded of liquid ingredients for beautifying the face, and cleanſing it from any deformity which the blood throws out. It alſo denotes a medicine that holds a medium between a fomentation and a bath.

LOTION, in pharmacy, a preparation of medicines by waſhing in ſome liquid, either to clear them of the dregs, or of ſome ſalt or corroſive ſpirit, or to communicate ſome virtue to them.

LOTUS, bird's-foot, trefoil, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is roundiſh, bent backward with an oblong concave unguis; the alæ are broad, roundiſh, and ſhorter than the vexillum, cloſing together at the top; the carina is gibbous underneath and ſhut above. The fruit is a cylindric pod, conſiſting of two valves, having many tranſverſe partitions, in each of which is placed a roundiſh ſeed.

LOVAGE, in botany, the Engliſh name for the liguſticum. See LIGUSTICUM.

LOVE-APPLE, the fruit of a ſpecies of ſolanum, a plant cultivated in gardens among us for the ſingularity of its appearance; the Portugueſe eat this fruit either raw or ſtewed, as do alſo the Jew-families in England.

LOUIS, or *Knight of St.* LOUIS, the name of a military order in France, inſtituted by Louis XIV. in 1693. Their collars are of a flame colour, and paſs from left to right; the king is their grand maſter.

LOUSE, *Pediculus*, in zoology. See the article PEDICULUS.

LOWERING, among diſtillers, a term uſed to expreſs the debaſing the ſtrength of any ſpirituous liquor by mixing water with it.

LOXIA, in the Linnæan ſyſtem of zoology, the name of a genus of birds of the order of the paſſeres, the diſtinguiſhing characters of which are, that the tongue is plain, equal, and whole; the beak large, thick, and ſhort, and crooked and convex both ways.

LOZENGE, LOZANGE, *Rhombus*, in geometry, a quadrilateral figure, conſiſting of four equal and parallel ſides, two of whoſe oppoſite angles are acute, and the other two obtuſe; the diſtance between the two obtuſe ones being always equal to the length of one ſide: when the ſides are unequal this figure is called a RHOMBOIDES, which ſee.

Scaliger derives the word from the Latin *laurengia*, as this figure ſomewhat reſembles that of a laurel leaf.

LOZENGE, in heraldry, a rhombus, or figure of equal ſides, but unequal angles, reſembling a quarry of glaſs in our old windows, placed erect, pointwiſe. It is in this figure that all unmarried

 gentle-

gentlewomen and widows bear their coats of arms; becauſe, as ſome ſay, it was the figure of the Amazonion ſhield; or, as others, becauſe it is the ancient figure of the ſpindle.

LOZENGE, in pharmacy, the ſame with what is otherwiſe called troche. See the article TROCHE.

LUCERNE, in botany, &c. a plant frequently cultivated in the manner of clover, and known among authors by the names of the medica and medicago.

It is the alfaſa of the Spaniards, and the lucerne, grand treffle, or fænum Burgundiacum, as ſome botaniſts call it, of the French. It has a perennial root, and an annual ſtalk, which riſes full three feet high in good land, and is garniſhed at each point with trifoliate leaves, whoſe lobes are ſpear-ſhaped, about an inch and a half long, and half an inch broad, ſawed towards the ſtalks. The flowers grow in ſpikes, which are from two to near three inches in length, ſtanding upon naked foot-ſtalks two inches long, riſing from the wings of the ſtalks: they are of the pea-bloom, or butterfly, kind; of a fine purple colour, and are ſucceeded by compreſſed moon-ſhaped pods, which contain ſeveral kidney-ſhaped ſeeds. It flowers in June, and its ſeed ripens in September.

There are the following varieties of this ſpecies of lucerne, viz. one with violet-coloured flowers; another with yellow flowers; a third with yellow and violet flowers mixed; and a fourth with variegated flowers: but, as Mr. Miller obſerves, theſe are only variations of the ſame plant, ariſing accidentally from the ſeed. However, neither the yellow nor the variegated flowered lucerne, is ever ſo ſtrong as that with purple flowers, nor is it, conſequently, ſo profitable to the huſbandman.

Columella calls this the choiceſt of all fodder, becauſe it will laſt ten years, and will bear being cut down four, and ſometimes ſix times in a year; it enriches the land on which it grows, fattens the cattle fed with it, and is a remedy for ſick cattle. About three quarters of an acre of it is abundantly ſufficient to feed three horſes during the whole year. Yet, notwithſtanding it was ſo much eſteemed by the ancients, and hath been cultivated to great advantage in France and Switzerland for many years, it has not yet found ſo good a reception in England as it juſtly deſerves; nor is it cultivated here in any conſiderable quantity, though it will ſucceed as well in this country as in either of the laſt mentioned; being extremely hardy, and reſiſting the ſevereſt cold of our climate.

The ſoil in which this plant is found to ſucceed beſt, in this country, is a light, dry, looſe, ſandy land, which ſhould be well ploughed and dreſſed, and the roots of all noxious weeds, ſuch as couch-graſs, &c. deſtroyed; otherwiſe they will overgrow the plants while young, and prevent their progreſs.

The beſt time to ſow the ſeed is about the middle of April, when the weather is ſettled and fair; for if you ſow it when the ground is very wet, or in a rainy ſeaſon, the ſeeds will burſt and come to nothing, as is often the caſe with ſeveral of the leguminous plants; therefore, you ſhould always obſerve to ſow it in a dry ſeaſon, and if there happens ſome rain in about a week or ten days after it is ſown, the plants will ſoon appear above-ground.

After having well ploughed and harrowed the land very fine, you ſhould make a drill quite acroſs the ground, almoſt half an inch deep, into which the ſeeds ſhould be ſcattered very thin; then cover them over a quarter of an inch thick, or ſomewhat more, with the earth: then proceed to make another drill, about a foot and a half from the former, ſowing the ſeeds therein in the ſame manner as before, and ſo proceed through the whole ſpot of ground, allowing the ſame diſtance between each row, and ſcatter the ſeeds very thin in the drills. In this manner, an acre of land will require about ſix pounds of ſeed: for when it is ſown thicker, if the ſeeds grow well, the plants will be ſo cloſe as to ſpoil each other in a year or two, the heads of them growing to a conſiderable ſize, as will alſo the roots, provided they have room; for the crown of ſome will meaſure eighteen inches diameter; from which near four hundred ſhoots have been cut at one time, which is an extraordinary increaſe, and this upon a poor, dry, gravelly ſoil, which had not been dunged for many years, but the roots were at leaſt ten years old; ſo that if this crop be well cultivated, it will continue many years, and be equally good as when it was firſt ſown: for the roots generally run down very deep in the ground, provided the ſoil be dry; and although they ſhould meet a hard gravel a foot below the ſurface, yet their roots would penetrate it and make their way downward, ſome of them having been taken up, which were above a yard in length, and had run two feet into a rock of gravel, ſo hard as not to be looſened without mattocks, and crows of iron, and that with much difficulty.

The reaſon for directing this ſeed to be ſown in rows is, that the plants may have room to grow; and for the better ſtirring the ground between them, to deſtroy the weeds, and encourage the growth of the plants, which may be very eaſily effected with a Dutch hoe, juſt after the cutting the crop each time, which will cauſe the plants to ſhoot again in a very little time, and be much ſtronger than in ſuch places where the ground cannot be ſtirred: but when the plants firſt come up, the ground between ſhould be hoed with a common hoe; and if in doing this you cut up the plants where they are too thick, it will cauſe the remaining to be much ſtronger. This hoeing ſhould be repeated two or three times while the plants are young, according as the weeds are produced, obſerving always to do it in dry weather,

ther, that the weeds may the better be deſtroyed; for if be done in moiſt weater, they will root and grow again.

With this management, the plants will grow to the height of two feet, or more, by the beginning of Auguſt, when the flowers will begin to appear, at which time the lucerne ſhould be cut, obſerving to do it in a dry ſeaſon, if it is to be made hay, and keep it often turning, that it may ſoon dry, and be carried off the ground: for if it lie long upon the roots, it will prevent their ſhooting again. After the crop is taken off, you ſhould ſtir the ground between the rows with a hoe, to kill the weeds, and looſen the ſurface, which will cauſe the plants to ſhoot out again in a ſhort time, ſo that by the beginning of September there will be ſhoots four or five inches high, when you may turn in ſheep upon it to feed it down: nor ſhould the ſhoots be ſuffered to remain upon the plants, which would decay when the froſty weather comes on, and fall down upon the crown of the roots, and prevent their ſhooting early the ſucceeding ſpring.

The beſt way therefore is to feed it until November, when it will have done ſhooting for that ſeaſon: but it ſhould not be fed with large cattle the firſt year, becauſe the roots being young, would be in danger of being deſtroyed, either by their trampling upon them, or their pulling them out of the ground: but ſheep will be of ſervice to the roots by dunging the ground, provided they do not eat too cloſe, ſo as to endanger the crown of the roots.

In the beginning of February, the ground between the rows ſhould be again ſtirred with the hoe, to encourage them to ſhoot again: but in doing this you ſhould be careful not to injure the crown of the roots, upon which the buds are at that time very turgid, and ready to puſh. With this management, if the ſoil be warm, by the middle of March the ſhoots will be five or ſix inches high, when, if you are in want of fodder, you may feed it down till a week in April; after which it ſhould be ſuffered to grow for a crop, which will be fit to cut the beginning of June, when you ſhould obſerve to get it off the ground as ſoon as poſſible, and ſtir the ground again with the Dutch hoe, which will forward the plants ſhooting again; ſo that by the middle, or latter end of July, there will be another crop fit to cut, which muſt be managed as before; after which it ſhould be fed down again in autumn: and as the rows by this time will have taken deep hold in the ground, there will be little danger of hurting them, if you ſhould turn in larger cattle; but you muſt always obſerve not to ſuffer them to remain after the roots have done ſhooting, leſt they ſhould eat down the crown of the roots below the buds, which would conſiderably damage, if not deſtroy them.

In this manner you may continue conſtantly to have two crops to cut, and two feedings upon this plant; and in good ſeaſons there may be three crops cut, and two feedings, which will be a great improvement, eſpecially as this plant will grow upon dry barren ſoils, where graſs will come to little, and be of great uſe in dry ſummers, when graſs is often burnt up: and as it is an early plant in the ſpring, ſo it will be of great ſervice when fodder falls ſhort at that ſeaſon, when it will be fit to feed at leaſt a month before graſs or clover; for this plant is often eight inches high by the middle of March, at which time the graſs in the ſame place is ſcarcely one inch high.

Cold will not injure this plant; for in the very cold winter, 1728-9, ſome roots of this plant which were dug up in October, and laid upon the ground in the open air till the beginning of March, were again planted, and they ſhot out very vigorouſly ſoon after: nay, even while they lay upon the ground, they ſtruck out ſhoots from the under ſide of the roots, and had begun to ſhoot green from the crown of the roots: but wet will altogether deſtroy the roots; for a little of the ſeed being ſown upon a moiſt ſpot of ground for a trial, it came up very well, and flouriſhed exceedingly during the ſummer ſeaſon; but in winter, when the great rains fell, the roots began to rot at bottom; and before the ſpring moſt of them were deſtroyed.

The beſt places to procure the ſeed from, are Swiſſerland, and the northern parts of France, which ſucceeds better with us than that which comes from a more ſouthern climate: but this ſeed may be ſaved in England in great plenty; in order to which, a ſmall quantity of the plants ſhould be ſuffered to grow uncut till the ſeeds are ripe, when it muſt be cut, and laid to dry in an open barn, where the air may freely paſs through: but the ſeed muſt be defended from the wet; for if it be expoſed thereto, it will ſhoot while it remains in the pod, whereby it will be ſpoiled. When it is quite dry, it muſt be threſhed out, and cleanſed from the huſk, and preſerved in a dry place till the ſeaſon for ſowing it: and this ſeed ſaved in England is much preferable to any brought from abroad; the plants produced from it being much ſtronger than thoſe produced from the French, Helvetian, and Turky ſeeds, which are ſown at the ſame time, and on the ſame ſoil and ſituation.

LUCID INTERVALS, in lunatics, the times wherein they appear to be in their full ſenſes. See the article LUNATIC.

LUCIDA, in aſtronomy, an appellation given to ſeveral fixed ſtars, on account of their ſuperior brightneſs; as the lucida coronæ, a ſtar of the ſecond magnitude, in the northern crown; the lucidæ hydræ, or cor hydræ; and the lucida lyræ, a ſtar of the firſt magnitude in that conſtellation.

LUCIUS, the pike, or jack, in ichthyology, a ſpecies of eſox, with a depreſſed roſtrum.

The pike grows to a conſiderable ſize, but uſually is found from fourteen inches to two feet in length: it is all over variegated with round yellowiſh ſpots. It is a well known and very voracious fiſh.

LUES, among phyſicians, is, in general, uſed for a diſeaſe of any kind; but, in a more particular ſenſe, is reſtrained to contagious and peſtilential diſeaſes: thus the lues Gallica, or venerea, ſignifies the venereal diſeaſe.

LUFF, amongſt ſailors, the order from the pilot to guide the ſhip's head nearer to the direction of the wind, or nearer to that part of the horizon from which the wind bloweth.

She keeps a good LUFF, i. e. holds her way well, without deviating to the leeward of her courſe. See the article LEEWARD.

LUFF-TACKLE, a complication of pullies, conſiſting of two blocks, which may be either both of them double, or one of them ſingle. The rope which forms the tackle, and is called the fall, is paſſed alternately through the blocks, and then has its end faſtened to one of them, till it becomes four or five fold: the mechanical power of a luff-tackle is very great, inſomuch that three or four men will draw as much weight with this as ſeven or eight would with a ſingle rope faſtened to the ſame body. See the article TACKLE.

LUKE, or *Goſpel of St.* LUKE, a canonical book of the New Teſtament.

Some think it was properly St. Paul's Goſpel, and that when that apoſtle ſpeaks of his Goſpel, he means what is called St. Luke's. Irenæus ſays, that St. Luke digeſted into writing what St. Paul preached to the gentiles; and Gregory Nazienzen tells us, that St. Luke wrote with the aſſiſtance of St. Paul.

"St. Luke, ſays a modern writer, is pure, copious, and flowing, in his language, and has a wonderful and entertaining variety of ſelect circumſtances in his narration of our Saviour's divine actions. He acquaints us with numerous paſſages of the evangelical hiſtory, not related by any other Evangeliſt; both in his Goſpel and Apoſtolical Acts, he is accurate and neat, clear and flowing, with a natural and eaſy grace: his ſtyle is admirably accommodated to the deſign of his hiſtory; it had a good deal of reſemblance to that of his great maſter St. Paul; and, like him, he had a learned and liberal education. I believe he had been very converſant with the beſt claſſics; for many of his words and expreſſions are exactly parallel to theirs." *Blackwall's Sacred Claſſics.*

St. LUKE *the Evangeliſt's Day*, a feſtival in the Chriſtian church, obſerved on the eighteenth of October.

LUMBAGO, in phyſic, a violent pain in the loins, which affects the patient in ſuch a manner that he can ſcarcely move. It is a ſcorbutic ſymptom, and frequently excited by the gout or rheumatiſm.

LUMBARIS, a name given to the arteries and veins which ſpread over the loins; or an epithet to diſtinguiſh thoſe branches of the aorta which carry the blood to the muſcles of the loins, to thoſe of the abdomen and other of the circumjacent parts, and alſo to certain veins which bring back the blood from the loins into the trunk of the vena cava.

LUMBRICAL, a name given to four muſcles of the fingers, and to as many of the toes. They are in each called the flexors of the firſt phalanx: thoſe of the fingers ariſe deep and tendinous, and are inſerted into the firſt phalanges on the ſide next the thumb: thoſe of the toes have their origin from the tendon of the muſculus perforans, and from the interior part of the calcaneum: their termination is at the firſt phalanx of the ſeveral toes.

LUNA, in aſtronomy, the moon. See the article MOON.

LUNA, among chemiſts, ſignifies ſilver. See SILVER.

LUNAR, ſomething belonging to the moon; thus we ſay lunar month, lunar year, lunar dial, lunar eclipſe, &c. See the articles MOON, MONTH, YEAR, &c.

LUNARIA, moon-wort in botany, a genus of plants whoſe flower is tetrapetalous and cruciform, it hath ſix ſtamina, two of which are ſhorter than the reſt; the fruit is a large, erect, plane, compreſſed, elliptical pod, opening with two valves, and containing two cells, which incloſe a few compreſſed kidney-ſhaped ſeeds.

LUNATIC, a perſon affected with lunacy, the cure of which is to be attempted by evacuations of all kinds; as bleeding, vomiting, cathartics, &c. See MADNESS.

LUNGS, a part of the human body, which is the cauſe or inſtrument of reſpiration. The lungs are the large viſcus of the thorax: they are ſituated in the two ſides of it, with the heart as it were between them; and are connected, by means of the mediaſtinum, with the ſternum and vertebræ; with the heart by means of the pulmonary veſſels, and immediately with the aſpera arteria. The colour of the lungs, in infants, is a fine florid red; in adults it is darker; and in old people, livid, or variegated with black and white. When inflated, they have ſome reſemblance to the hoof of an ox: and are convex on the upper ſide, and concave underneath. They are divided into two large lobes, the right and left; the left, which is the ſmaller, is divided again into three ſmaller ones. The membrane with which the lungs are ſurrounded, is continuous with the pleura. The ſubſtance of the lungs

lungs is ſpongeous, or veſiculous, and they ſeem, indeed, entirely compoſed of a number of ſmall veſicles of a fleſhy texture, and of a variety of veſſels.

The veſſels of the lungs are the bronchia, the bronchial artery and vein, the pulmonary artery and vein, the nerves, and the lymphatics. See BRONCHIA, &c.

The uſes of the lungs are, 1. To perform the office of reſpiration, by which the blood is attenuated in the plexus of the arteries called the rete vaſculoſum. 2. To be aſſiſtant to the voice in ſpeaking and to the ſenſe of ſmelling. They are alſo emunctories of the blood, and are of many other important ſervices.

LUNG-WORT, *Pulmonaria*, in botany. See PULMONARIA.

LUNISOLAR YEAR, in chronology, a period of years produced by multiplying the cycle of the moon, 19, by 28, that of the ſun; the product is 532; in which ſpace of time theſe luminaries return to the ſame point in the heavens.

LUNULA, in geometry, a plane figure like a creſcent, or half moon, for the quadrature of which, ſee QUADRATURE.

LUPERCALIA, in antiquity, a feſtival of the antient Romans in honour of the god Pan, obſerved on the fifteenth of February, and ſo called from the luperci, the prieſts of that fabulous deity.

LUPIA, in ſurgery, a kind of incyſted tumor, called alſo talpa and teſtuda. See ENCYSTED and TUMOR.

LUPINUS, *Lupine*, in botany, a genus of plants, the corolla of which is papilionaceous; the vexillum is cordated, roundiſh, and emarginated; the alæ are oval, and almoſt of the ſame length with the vexillum; the carina is divided into two ſegments at the baſe: the fruit is a large, oblong, coriaceous, compreſſed, acuminated pod, containing only one cell, which includes ſeveral roundiſh compreſſed ſeeds.

LUPULMUM, in botany, a ſpecies of trefoil. See the article TREFOIL.

LUPULUS, the hop, in botany, &c. See the article HOP.

LUPUS, the wolf, in zoology. See the article WOLF.

LUPUS MARINUS, the ſea-wolf, in ichthyology, conſtitutes a diſtinct genus of malacopterygious fiſhes; with a compreſſed body, and ſix or more oſſicles in the membrane of the gills. On the back there is only one fin, which extends almoſt from the head to the tail. It is a very ſingular fiſh, growing to four or five feet long.

LUPUS, in aſtronomy, a conſtellation of the ſouthern hemiſphere. See CENTAUR.

LURE, in falconry, a device of leather, in the form of a bird, with two wings ſtuck with feathers, and baited with a piece of fleſh; wherewith to reclaim or call back a hawk, when at a conſiderable diſtance.

LUSERNE, or LUCERNE. See the article LUCERNE.

LUSTRATION, in antiquity, ſacrifices or ceremonies by which the ancients purified their cities, fields, armies, or people, defiled by any crime or impurity.

LUSTRE, the gloſs or brightneſs appearing on any thing, particularly on manufactures of ſilk, wool, or ſtuff. It is likewiſe uſed to denote the compoſition or manner of giving that gloſs.

The luſtre of ſilks is given them by waſhing in ſoap, then clear water, and dipping them in alum-water cold. To give ſtuffs a beautiful luſtre, for every eight pounds of ſtuff allow a quarter of a pound of linſeed; boil it half an hour, and then ſtrain it through a cloth, and let it ſtand till it is turned almoſt to a jelly: afterwards, put an ounce and a half of gum to diſſolve twenty-four hours; then mix the liquor, and put the cloth into this mixture; take it out, dry it in the ſhade, and preſs it: if once doing is not ſufficient, repeat the operation. Curriers give a luſtre to black leather, firſt with juice of barberries, then with gum-arabic, ale, vinegar, and Flander's glue, boiled together. For coloured leather they uſe the white of an egg beaten in water. Moroccoes have their luſtre from juice of barberries and lemon or orange. For hats, the luſtre is frequently given with common water, ſometimes a little black dye is added: the ſame luſtre ſerves for furs, except that for very black furs they ſometimes prepare a luſtre of galls, copperas, Roman alum, ox's marrow, and other ingredients.

LUSTRUM, in Roman antiquity, a general muſter and review of all the citizens and their goods, which was performed by the cenſors every fifth year, who afterwards made a ſolumn luſtration.

LUTE, or LUTING, among chemiſts, a mixed, tenacious, ductile ſubſtance, which grows ſolid with drying, and when applied to the junctures of veſſels for diſtillation, ſtops them up.

When the ſubject is merely aqueous, linſeed meal, ground fine, and well worked up into a ſtiff paſte with the white of an egg, makes a proper luting; it grows hard with heat, and if it happens to crack, it is repaired by a freſh application.

In the diſtillation of all fermented inflammable ſpirits and volatile alkaline ſalts, a paſte made of the ſame meal, well worked up with cold water, anſwers very well.

In the diſtillation of mild acids or acetous liquors, a bladder ſteeped in water, till it grows ſlimy, makes an excellent luting.

A luting that requires a ſtony hardneſs is neceſſary in the diſtillation of foſſil acids, as vitriol, ſea-ſalt, &c. which is called the philoſophical luting, and may be prepared from the calx of copperas and

quick-

quick-lime, by boiling the caput mortuum in vitriol, in ſeveral parcels of water, till thoroughly waſhed, then drying the powder and preſerving it in a cloſe veſſel. This powder is to be rubbed with an equal quantity of quick-lime, and wrought into a paſte with the whites of eggs firſt beat thin; and this luting is immediately to be applied to the veſſel, being firſt a little heated: or beat pure ſand and potter's clay together in ſuch proportion with water, till the matter no longer ſticks to the fingers; then add a fourth part of common lime, and the drier this is applied, the better, provided it be left ductile, and the cracks are eaſily ſtopped up by the ſame.

To coat veſſels in the ſtronger diſtillations with a naked fire, beat fat potter's earth and powdered ſand with water into a well wrought paſte, which will not ſtick to the fingers, adding a little common lime at the laſt, and beating them together: then the veſſel being expoſed to the vapour of hot water, ſpread the cement all over it equably with the hand, afterwards ſprinkle the ſurface of the coating with hot and dry ſand, and let the coat dry ſlowly in a cool place, minding to fill up the cracks.

The London chemiſts uſe for the ſame purpoſe ſifted wood-aſhes, beat up to a due conſiſtence with the white of eggs and a little gum-water. The ſame ſervice may be performed in a more excellent manner, by a mixture of linſeed-oil and ceruſs made by inſolation or decoction, and afterwards ground upon a marble with freſh ceruſs, till the whole be of the conſiſtence of an unguent.

LUTE is alſo a muſical inſtrument with ſtrings.

LUTHERANS, the Chriſtians who follow the opinions of Martin Luther, one of the principal reformers of the church in the ſixteenth century.

LUTHERN, in architecture, a kind of window over the corniche, in the roof of a building, ſtanding perpendicularly over the naked of a wall, and ſerving to illuminate the upper ſtory.

Lutherns are of various forms, as ſquare, ſemicircular, round; called bulls-eyes, flat arches, &c.

LUTRA, the otter, in zoology. See the article OTTER.

LUTUM, among chemiſts, denotes a lute; and *lutum ſapientiæ*, the hermetical ſeal. See LUTE and HERMETICAL.

LUXATION, *Luxatio*, in ſurgery, the receſs or removal of the moveable extremity of a bone from the hollow or ſocket in which it naturally moved, accompanied with a hindrance of motion. This removal is either total or partial; the former is a luxation, and the latter a diſtortion.

LYCANTHROPY, *Lycanthropia*, in phyſic, a ſpecies of madneſs or melancholy, in which the patients wander about in the night-time, and in every thing imitating the wolves. Some bite and ſnarl like dogs, and hence it has been called cynanthropy. The word is derived from the Greek λυκος, a wolf, and ανθρωπος, a man.

LYCEUM, in Grecian antiquity, an academy ſituated upon the banks of the Iliſſus at Athens. It was compoſed of porticos and walks, where Ariſtotle taught philoſophy; walking there conſtantly every day till the hour of anointing, whence he and his followers were called Peripatetics. See PERIPATETICS.

LYCHNIDEA, in botany. See the article PHLOX.

LYCHNIS, campion, in botany, a genus of plants whoſe flower conſiſts of five petals, the ungues of which are of the ſame length with the cup, with a plane broad border: it hath ten filaments alternately ranged, and terminated with incumbent antheræ: the fruit is an oblong, oval, unilocular capſule, opening with five valves, containing a number of roundiſh ſeeds.

A ſpecies (commonly called ſcarlet-lychnis) is cultivated in our gardens for the ſake of its beautiful flowers; it is propagated by ſowing its ſeeds in the ſpring, and afterwards tranſplanted where they are to remain: a variety of this ſpecies, producing double flowers, is increaſed by parting the roots in autumn, or from cuttings in June.

LYCIUM, box-thorn, in botany, a genus of plants, whoſe flower is monopetalous and infundibuliform; the tube is cylindraceous and incurved, and the limb divided into five obtuſe ſegments: the ſtamina are five very ſhort filaments, topped with erect antheræ: the fruit is a roundiſh bilocular berry, containing a number of kidney ſhaped ſeeds.

LYCODONTES, in natural hiſtory, the petrified teeth of the lupus piſcis, or wolf-fiſh, frequently found foſſile. They are of different ſhapes, but the moſt common kind riſe into a ſemi-orbicular form, and are hollow within, ſomewhat reſembling an acorn cup: this hollow is found ſometimes empty, and ſometimes filled with the ſtratum in which it is immerſed. Many of them have an outer circle, of a different colour from the reſt.

LYCOPERDON, puff-ball, in botany, a genus of funguſes, of a fleſhy ſubſtance like other muſhrooms, and roundiſh ſhape. They are ſometimes ſeſſile, and ſometimes ſtand on a thick pedicle: they produce ſeparate male and female flowers, contained in the cellular fungous ſubſtance, which remains a long time confuſed, and the fructifications not formed: and when they are formed, and the cells diſtinct, it is but a very ſhort time before the very matter of the cells breaks to powder, and the ſeeds fall out of the cavities of the placentæ; and the whole matter, powder, ſeeds, and filaments, of the placentæ, are diſcharged altogether in form of a fine duſt.

Of this genus there are a great many ſpecies, the moſt remarkable of which is the ſtarry-lycoperdon, with multifid rays, and a ſtellated oſculum.

LYCOPODIUM, wolf's-claw-moſs, in botany, a genus of moſſes conſiſting of branches, furniſhed with leaves, and producing ſpikes, formed of ſquamæ of a different figure from the leaves, at the baſes of which are placed bivalvular kidney-ſhaped antheræ, which is the only diſcoverable part of the male flowers; the female flower conſiſts of a tetraphyllous calyx, without a piſtillum; and the ſeeds are only a naked corculum, without cotyledon or tunic.

LYCOPUS, water hore-hound, in botany, a genus of plants, the flower of which is monopetalous; the tube is cylindraceous, and the border cut in four obtuſe ſegments: it hath two filaments, topped with ſmall antheræ: there is no pericarpium; but the ſeeds, which are roundiſh and four in number, are placed in the bottom of the cup.

LYING-To, or LYING-BY, in navigation, arranging the ſails in ſuch a ſituation that they counteract each other nearly with equal effort, ſome of them drawing her forward, and others forcing her back; the effect of which is, that ſhe makes no way through the ſea, only a very little to the leeward. The intent of lying by, in general, is to wait for ſome ſhip or boat which is approaching or expected; or in the night time to prevent running on land, ſhoals, or in the way of danger apprehended to be near.

LYING-To *in a Storm*, is going with a very little ſail to keep the ſhip from rolling violently, and is more properly expreſſed trying. See TRYING.

LYMPH, *Lympha*, a fine fluid, ſeparated in the body from the maſs of blood, and contained in peculiar veſſels.

LYMPHATICS, or LYMPHEDUCTS, in anatomy, fine ſmall veſſels that convey the lymph.

LYNX, or OUNCE, in zoology, a ſpecies of the felis kind, with a truncated tail, a brown body ſpotted with black; the head is large, but not very long; the forehead is flat; the eyes are very large and fierce; the ears are very large and open, but they terminate in a point at the top, and are there ornamented with a pencil of fine black hairs; the mouth is furniſhed with very terrible teeth, and there are whiſkers about it, as alſo over the eyes; the neck is long and thick, the breaſt large and broad, the legs ſtrong, the claws terrible, the tail ſhort and abrupt; and the whole animal large and robuſt, ſomewhat leſs than the lion, very fierce, and remarkable for the quickneſs of its ſight.

LYRE, *Lyra*, a muſical inſtrument of the ſtring king, much uſed by the ancients. See CITHARA.

The lyre, among poets, painters, ſtatuaries, carvers, &c. is attributed to Apollo and the Muſes.

LYRE, *Lyra*, in aſtronomy, a conſtellation of the northern hemiſphere, the number of whoſe ſtars in Ptolemy's and Tycho's catalogues are only ten, but nineteen in the Britannic catalogue.

LYRIC, in general, ſignifies ſomething ſung or played on the lyre; but it is more particularly applied to the ancient odes and ſtanzas, anſwering to our airs and ſongs, and may be played on inſtruments.

LYSIMACHIA, looſe-ſtrife, in botany, a genus of plants whoſe flower is monopetalous and rotated; the limb is divided into five oblong, oval, ſpreading ſegments; it hath ſubulated filaments topped with acuminated antheræ: the fruit is a globoſe unilocular capſule, opening with ten valves, and contains a number of angulated ſeeds: the receptacle is large, globoſe, and punctated.

LYTHRUM, willow-herb, in botany, a genus of plants, the corolla of which conſiſts of ſix oblong, obtuſe, patent petals, inſerted by their ungues into the indentures of the cup; it hath ten ſlender ſtamina; and the fruit is an oblong acuminated capſule, having two cells, which are filled with a great number of ſmall ſeeds.

M.

M, A liquid conſonant, and the twelfth letter of the alphabet.

The ſound of this letter is formed by ſhutting the lips, and thereby intercepting the breath, as it is ſtrongly expreſſed through the mouth and noſtrils jointly. Its ſound is always the ſame in Engliſh; it ſuffers no conſonant after it in the beginning of words and ſyllables, unleſs in ſome derived from the Greek, as *amneſty*, &c.

M. in preſcription, ſignifies a maniple, or handful; and at the end of a receipt it imports *miſce*, or mingle.

M, in aſtronomy, &c. denotes meridional, ſouthern; ſometimes *meridies*, or mid-day.

M, in law, the brand of a perſon convicted of manſlaughter, and admitted to the benefit of the clergy; it is burnt on the brawn of the left thumb.

M, among the ancients, was a numeral letter, ſignifying one thouſand; and when a daſh was added at the top of it, as $\overline{M}$, it ſignified a thouſand times a thouſand.

MABBY, according to Mr. Boyle, is a kind of wine made from potatoes, and ſaid to be uſed in Barbadoes.

MACAO, or MACAW, in ornithology, a name given to the larger ſpecies of parrots with very long tails.

MACARONIC, or MACARONIAN, an appellation given to a burleſque kind of poetry, made up of a jumble of words of different languages, and words of the vulgar tongue latinized.

MACCABEES, two apocryphal books of Scripture: ſo called from Judas Mattathias, ſurnamed Maccabeus. The firſt book of the Maccabees is an excellent hiſtory, and comes neareſt the ſtyle and manner of the ſacred hiſtorians of any extant. It contains the hiſtory of forty years, from the reign of Antiochus Epiphanes to the death of Simon the high-prieſt; that it, from the year of the world 3829 to the year 3869, 131 years before Chriſt. The ſecond book of the Maccabees begins with two epiſtles ſent from the Jews of Jeruſalem to the Jews of Egypt and Alexandria, to exhort them to obſerve the feaſt of the dedication of the new altar, erected by Judas on his purifying the temple. After theſe epiſtles follows the preface of the author to his hiſtory, which is an abridgement of a larger work, compoſed by one Jaſon, a Jew of Cyrene, who wrote the hiſtory of Judas Maccabeus, and his brethren, and the wars againſt Antiochus Epiphanes, and Eupator his ſon. The ſecond book does not, by any means, equal the accuracy and excellency of the firſt. It contains a hiſtory of about fifteen years, from the execution of Heliodorus's commiſſion, who was ſent by Seleucus to fetch away the treaſures of the temple, to the victory obtained by Judas Maccabeus over Nicanor; that is, from the year of the world 3828, to the year 3843, 147 years before Chriſt.

MACE, *Macis*, the ſecond coat or covering of the nutmeg.

It is a thin and flat membranous ſubſtance, of an oleaginous nature, a yellowiſh colour, extremely fragrant, and of a pleaſant, but acrid and oleaginous taſte. It is to be choſen new, not dry, and of a fragrant ſmell, tough, oleaginous, and of a good yellow.

Mace is carminitive, ſtomachic, and aſtringent; it poſſeſſes all the virtues of the nutmeg, if taken in a larger doſe; and people have become delirious, for ſome hours, after an immoderate uſe of it. The oils of mace and nutmeg, whether prepared by diſtillation or by expreſſion, are ſo much of the ſame nature, that they may be indiſcriminately uſed for one another on all occaſions. They give eaſe in cholics, and often in nephritic caſes, taken internally from one drop to five or ſix of the diſtilled oil, or an unequal quantity of the expreſſed; and externally, they are of uſe to rub up paralytic limbs; they alſo aſſiſt digeſtion, and will often ſtop vomitings and hiccoughs, only by being rubbed on the regions of the ſtomach. The nurſes have a cuſtom of applying oil of mace, by expreſſion, to children's navels to eaſe their gripes, and that often with ſucceſs; and we are aſſured by authors of credit, that, rubbed on the temples, it promotes ſleep.

The oils, by diſtillation, are very properly added to the ſtronger cathartics in form of pills, and prove excellent correctives.

MACERATION, *Maceratio*, in pharmacy, an infuſion or ſoaking of ingredients in water, &c. in order either to ſoften them, or extract their virtues. It is a kind of digeſtion.

MACHINE, *Machina*, in general, whatever hath force ſufficient to raiſe or ſtop the motion of a heavy body.

Machines are either ſimple or compound; the ſimple ones are the ſeven mechanical powers, viz. lever, balance, pully, axis and wheel, wedge, ſcrew, and inclined plane. See MECHANICAL POWERS, LEVER, BALANCE, &c.

If the given power is not able to overcome the given reſiſtance when directly applied, that is, when the power applied is leſs than the weight or reſiſtance given; then the thing is to be performed by the help of a machine made with levers, wheels, pullies, ſcrews, &c. ſo adjuſted, that when the weight and power are put in motion on the machine, the velocity of the power may be at leaſt ſo much greater than that of the weight, as the weight and friction of the machine, taken together, is greater than the power. For on this principle depends the mechaniſm or contrivance of mechanical engines uſed to draw or raiſe heavy bodies, or overcome any other force; the whole deſign of theſe being to give ſuch a velocity to the power in reſpect of the weight, as that the momentum of the power may exceed the momentum of the weight. For if machines are ſo contrived, that the velocity of the agent and reſiſtant are reciprocally as their forces, the agent will juſt ſuſtain the reſiſtant; but with a greater degree of velocity will overcome it. So that if the exceſs of velocity in the power is ſo great as to overcome all that reſiſtance which commonly ariſes from the friction or attrition of contiguous bodies, as they ſlide by one another, or from the coheſion of bodies that are to be ſeparated, or from the weights of bodies to be raiſed; the exceſs of the force remaining, after all theſe reſiſtances are overcome, will produce an acceleration of motion proportional thereto, as well in the parts of the machine, as in the reſiſting body.

MACHINERY, in epic and dramatic poetry, is when the poet introduces the uſe of machines, or brings ſome ſupernatural being upon the ſtage, in order to ſolve ſome difficulty, or to perform ſome exploit out of the reach of human power. The ancient dramatic poets never made uſe of machines, unleſs where there was an abſolute neceſſity for ſo doing; whence the precept of Horace,

Nec Deus interſit, niſi dignus vindice nodus inciderit.

It is quite otherwiſe with epic poets, who introduce machines in every part of their poems; ſo that nothing is done without the intervention of the gods. In Milton's Paradiſe Loſt, by far the greater part of the actors are ſupernatural perſonages: Homer and Virgil do nothing without them; and in Voltaire's Henriade, the poet has made excellent uſe of St. Louis.

As to the manner in which theſe machines ſhould act, it is ſometimes inviſibly, by ſimple inſpirations and ſuggeſtions; ſometimes by actually appearing under ſome human form; and, laſtly, by means of dreams and oracles, which partake of the other two. However, all theſe ſhould be ſo managed as to keep within the bounds of probability.

MACKREL, in ichthyology, a ſpecies of ſcomber, with five pinnules at the extremity of the back, and a ſpine at the anus.

MACROCOSM, the great world, or univerſe.

The word is Greek, μακροκοσμος, and derived from μακρος, great, and κοσμος, the world.

MACROLOGY, in rhetoric, a too copious ſtyle. See the article STYLE.

MACULÆ, in aſtronomy, dark ſpots appearing on the luminous faces of the ſun, moon, and even ſome of the planets; in which ſenſe they ſtand contradiſtinguiſhed from faculæ. See the article FACULÆ.

Theſe ſpots are moſt numerous and eaſily obſerved in the ſun. It is not uncommon to ſee them in various forms, magnitudes, and numbers, moving over the ſun's diſk. They were firſt of all diſcovered by the Lyncean aſtronomer Galileo, in the year 1610, ſoon after he had finiſhed his new invented teleſcope. That theſe ſpots adhere to, or float upon, the ſurface of the ſun, is evident for many reaſons. 1. Many of them are obſerved to break out near the middle of the ſun's diſk; others to decay and vaniſh there, or at ſome diſtance from his limb. 2. Their apparent velocities are always greateſt over the middle of the diſk, and gradually ſlower from thence on each ſide towards the limb. 3. The ſhape of the ſpots varies according to their poſition on the ſeveral parts of the diſk: thoſe which are round and broad in the middle, grow oblong and ſlender as they approach the limb, according as they ought to appear by the rules of optics.

By comparing many obſervations of the intervals of time in which the ſpots made their revolution, by Galileo, Caſſini, Scheiner, Hevelius, Dr. Halley, Dr. Derham, and others, it is found that 27 days, 12 hours, 20 minutes, is the meaſure of one of them at a mean; but in this time the earth deſcribes the angular motion of 26° 22′, about the ſun's center: therefore ſay, as the angular motion of 360°+26° 22′, is to 360°; ſo is 27 days, 12 hours, 20 minutes, to 25 days, 15 hours, 16 minutes; which, therefore, is the time of the ſun's revolution about its axis.

As to the magnitude of the ſpots, they are very conſiderable, as will appear if we obſerve that ſome of them are ſo large as to be plainly viſible to the naked

naked eye; thus Galileo saw one of them in the year 1612; and Mr. Martin assures us, that he knew two gentlemen that thus viewed them within a few years past; whence he concludes, that these spots must therefore subtend, at least, an angle of one minute. Now the diameter of the earth, if removed to the sun, would subtend an angle of but 20″; so that the diameter of a spot, just visible to the naked eye, is, to the diameter of the earth, as 60 to 20, or as three to one; and, therefore, the surface of the spot, if circular, to a great circle of the earth, is as 9 to 1; but four great circles are equal to the earth's superficies; whence the surface of the spot is, to the surface of the earth, as 9 to 4, or as 2 $\frac{1}{4}$ to 1. Gassandus says, he saw a spot whose diameter was equal to $\frac{1}{20}$ of that of the sun, and therefore subtended an angle at the eye of 1′ 3″; its surface was therefore 5 times larger than the surface of the whole earth.

What these spots are, it is presumed, no body can tell; but they seem to be rather thin substances than solid bodies, because they lose the appearance of solidity in going off the disk of the sun: they resemble something of the nature of scum or scoria, swimming on the surface, which are generated and dissolved by causes little known to us: but whatever these solar spots are, it is certain they are produced from causes very inconstant and irregular; for Scheiner says he frequently saw fifty at once, but for twenty years after scarce any appeared. And in this century the spots were very frequent and numerous till the year 1741, when, for three years successively, very few appeared; and now, since the year 1744, they have again appeared as usual.

These maculæ are not peculiar to the sun, they have been observed in all the planets. Thus Venus was observed to have several by signior Bianchini, in the year 1726. As in Venus, so in Mars, both dark and bright spots have been observed, first by Galileo, and afterwards by Cassini, &c. Jupiter has had his spots observable ever since the invention and use of large telescopes. Saturn, by reason of his great distance on one hand, and Mercury, by reason of his smallness and vicinity to the sun on the other, have not as yet had any spots discovered on their surfaces, and consequently nothing in relation to their diurnal motions and inclinations of their axis to the planes of their orbits can be known, which circumstances are determined in all the other planets, as well as in the sun, by means of these maculæ. See the articles VENUS, MARS, and JUPITER.

The spots, or maculæ, observable on the moon's surface, seem to be only cavities or large caverns, on which the sun shining very obliquely, and touching only their upper edge with his light, the deeper places remain without light; but as the sun rises higher upon them, they receive more light, and the shadow, or dark parts grow smaller and shorter, till the sun comes at last to shine directly upon them, and then the whole cavity will be illustrated: but the dark, dusky spots, which continue always the same, are supposed to proceed from a kind of matter or soil which reflects less light than that of the other regions. See MOON.

MAD-APPLE, in botany. See the article MELONGENA.

MADWORT, *Alysson*, in botany. See the article ALYSSON.

MADDER, *Rubia*, in botany, a genus of plants, whose flower is monopetalous, campanulated, and divided into four segments; it hath four subulated filaments, which are shorter than the corolla; these are topped by simple antheræ. The fruit consists of two smooth berries growing together, each containing a single, roundish, umbilicated seed.

A species called Rubia tinctorum sativa, is much cultivated in Holland, the root being necessary for the use of dyers and callico printers, and is so essential to both manufactures, as neither of those businesses can be carried on without this commodity; and the consumption of it is so great here, as that upon a moderate computation, there is annually so much of it imported from Holland, as the price of it amounts to more than one hundred thousand pounds, which might be saved to the public if a sufficient quantity of it was planted in England, where it may be cultivated to greater advantage than in Holland, the land here being better adapted to grow this plant; but as the growing it in quantity has been for several years discontinued with us, so the method of culture is not well known to many persons here; and as there is at present an inclination in the public to regain this lost branch of trade, (for formerly there was not only enough of this commodity raised in England for our own consumption, but also great quantities exported) and the great premiums offered by the Society for the Encouragement of Arts, Manufactures, and Commerce, to those who raise the greatest quantities of this useful plant, we shall therefore give a description of the plant, and the method of culture, as practised in Holland.

The root is perennial, and composed of many long, thick, succulent fibres; these are joined at the top in a head, and is remarkable for its red colour and firm texture; it is somewhat transparent, and has a yellowish pith in the middle, which is tough, and of a bitterish taste: from the root arises many four-cornered, jointed, annual stalks, which in good land will grow five or six feet long, and, if supported, sometimes seven or eight; they are armed with short herbaceous prickles, and at each joint are placed five or six spear-shaped leaves, that surround the stalk in form of a star: from the joints of the stalks come out the branches which sustain the flowers; they are placed opposite by pairs, each pair crossing the other; these have a few small leaves toward

toward the bottom; the branches are terminated by looſe branching ſpikes of yellow flowers, theſe appear in June, and are ſometimes ſucceeded by ſeeds, which never ripen in England

The beſt madder is cultivated in Schowen, one of the iſlands of Zealand, which is performed in the following manner:

The land which is deſigned for madder, if it is ſtrong and heavy, is ploughed twice in autumn, that the froſt in winter may mellow it and break the clods, then it is ploughed again in the ſpring, juſt before the time of planting; but if the ground is light, then it is ploughed twice in the ſpring, at the laſt ploughing it is divided into lands of three feet broad, with furrows between each land four or five inches deep. Madder requires a loomy ſubſtantial ſoil, not too ſtiff and heavy, nor over light and ſandy. The time for planting madder begins toward the end of April, and continues all May, and ſometimes, in very backward ſprings, there is ſome planted the beginning of June. The young ſhoots from the ſides of the roots are taken off from the mother plant, with as much root as poſſible, and are planted with a dibber in rows at one foot aſunder, and commonly four in a row. The firſt year the madder is planted, it is cuſtomary to plant cabbages or dwarf kidney beans in the furrows between the beds; but there is always great care taken to keep the ground clear from weeds. In September or October, when the young madder is cleaned for the laſt time that ſeaſon, the green ſtalks are carefully ſpread down over the beds, without cutting off any part; and in November it is covered three or four inches with earth.

The ſecond year, in the beginning of April, which is about the time the young ſhoots ſpring forth, the earth on the top of the beds ſhould be ſcuffled over and raked, to deſtroy the young weeds, and make the ſurface ſmooth and mellow. The ſucceeding ſummer, there muſt be the ſame care taken to keep the madder clean, not admitting any other crop to be with it, and the ſucceeding autumn they muſt be earthed as before.

As madder-roots are ſeldom dug up the ſecond year, but after it has grown three ſummers, the culture of the laſt is the ſame as the former. In September it is dug up and carried to a ſtove to be dried; which being done ſufficiently, it is afterwards pounded, ſifted, and put in caſks.

When madder is thus prepared and caſked, it is, in Zealand, examined by ſworn eſſayers, and tried if it is not faulty packed up, that is, whether in preparing it is properly manufactured, and to ſee if every part of the caſk is filled with madder of equal goodneſs and quantity, not burned in drying, nor mixed with dirt.

In medicine, the root is attenuant, and has the credit of being a vulnerary of the firſt rank. It is given in chronical caſes, where there are obſtructions of the viſcera; and is good in the jaundice, dropſy, and obſtructions of the ſpleen; its doſe is from five grains to fifteen, but is ſeldom given ſingly. Madder has one very uncommon property, that is, it will turn the bones red of thoſe animals that have fed upon it ſome time.

MADNESS, *Mania*, a moſt dreadful kind of delirium without a fever.

Melancholy and madneſs may very juſtly be conſidered as diſeaſes nearly allied; for they have both the ſame origin, that is, an exceſſive congeſtion of blood in the brain: they only differ in degree, and with reſpect to the time of invaſion; melancholy being the primary diſeaſe, of which madneſs is the augmentation. Both theſe diſeaſes ſuppoſe a weakneſs of the brain, which may proceed from an hereditary diſpoſition; from violent diſorders of the mind, eſpecially long continued grief, ſadneſs, anxiety, dread, and terror; from cloſe ſtudy and intenſe application of mind to one ſubject; from narcotic and ſtupefying medicines; from previous diſeaſes, eſpecially acute fevers; from a ſuppreſſion of hæmorrhages, and omitting cuſtomary bleeding; from exceſſive cold, eſpecially of the lower parts, which forces the blood to the lungs, heart, and brain; and from violent anger, which will change melancholy into madneſs.

It is evident from obſervation, that the blood of maniac patients is black, and hotter than in the natural ſtate; that the ſerum ſeparates more ſlowly and in a leſs quantity than in healthy perſons; and that the excrements are hard, of a dark red or greyiſh colour, and the urine light and thin.

The antecedent ſigns of madneſs are a redneſs and ſuffuſion of the eyes with blood, a tremulous and inconſtant vibration of the eye-lids, a change of diſpoſition and behaviour; ſupercilious looks, a haughty carriage, diſdainful expreſſions, a grinding of the teeth, and unaccountable malice to particular perſons; alſo little ſleep, a violent head-ach, quickneſs of hearing, incredible ſtrength, inſenſibility of cold; and, in women, an accumulation of blood in the breaſts, in the increaſe of this diſorder.

Diſeaſes of the mind have ſomething in them ſo different from other diſorders, that they ſometimes remit for a long time, but return at certain periods, eſpecially about the ſolſtices. It may likewiſe be obſerved, that the raving fits of mad people, which keep the lunar periods, are generally accompanied with epileptic ſymptoms.

This diſeaſe, when it is primary or idiopathic, is worſe than the ſymptomatic, that accompanies the hyſteric or hypochondriac paſſion, which is eaſily cured; as is that alſo which ſucceeds intermitting fevers, a ſuppreſſion of the menſes, of the lochia, of the hæmorrhoids, or which is occaſioned by narcotics. When the paroxyſms are ſlight in the idiopathic

pathic kind, the cure is not very difficult; but if it is inveterate, and has but ſhort remiſſions, it is almoſt incurable. Sometimes this diſeaſe terminates by critical excretions of blood from the noſe, uterus, or anus; ſometimes diarrhœas and dyſenteries will terminate theſe diſorders; and puſtules, ulcers, and the itch, have alſo done the ſame. As to the cure, bleeding is the moſt efficacious of all remedies; and where there is a redundance of thick grumous blood, a vein is firſt to be opened in the foot, a few days after in the arm; then in the jugular vein, or one in the noſtrils with a ſtraw; and laſt of all the frontal vein, with a blunt lancet, for fear of hurting the pericranium. Tepid baths made of rain or river-water are alſo convenient; and before the patient enters the bath, he ſhould have cold water poured on his head. Purgatives are likewiſe uſeful; but the lenient are to be preferred to the draſtic: thus manna, caſſia, rhubarb, cream of tartar, or tartar vitriolate, are moſt convenient, when the diſeaſe ariſes from the hypochondriac paſſion, a ſtagnation of the blood in the inteſtines, or in the ramifications of the vena portæ, eſpecially when taken in decoctions and infuſions at repeated intervals, ſo as to operate in an alterative manner. Some kinds of mineral waters are alſo highly efficacious in melancholy and madneſs: but nothing is better for removing the cauſe of theſe diſorders, than depurated mercury. Particular medicines among vegetables, are balm, betony, vervain, brook-lime, ſage, worm-blood, flowers of St. John's-wort, of the lime-tree, and camphire; from animals, aſs's blood; among minerals, ſteel, cinnabar, ſugar of lead, and the calx and tincture of ſilver. Hoffman is of opinion, that nothing better deſerves the name of a ſpecific in theſe diſeaſes than motion and exerciſe, when duly proportioned to the ſtrength of the body. Sadative medicines are good, but not opiates and narcotics, for theſe induce ſtupidity and folly: theſe that are good in an epilepſy, will be here beneficial, ſuch as caſtor, ſhavings of hartſhorn, the roots and ſeeds of piony, antiepileptic powders, the valerian root, flowers of the lily of the valley, and of the lime-tree. Boerhaave ſays, the principle remedy for raving madneſs is dipping in the ſea, and keeping the patient there as long as he can bear it. As a high degree of the itch has terminated theſe diſorders, it may be proper to make iſſues in the back; but bliſters, contrary to Shaw's opinion, are prejudicial; for by ſtimulating the nervous membranes and the dura mater, they increaſe the ſpaſmodic ſtricture, and the motion of the groſs and bilious blood through the head and the other parts of the body.

As to the diet, the patient ſhould carefully abſtain from ſalt and ſmoked fleſh, whether beef or pork; from ſhell fiſh; from fiſh of a heavy and noxious quality; from aliments prepared with onions and garlic: all which generate a thick blood. He ſhould, in general, eat no more than is ſufficient to ſupport nature. Small beer, or cold pure water, are the beſt drink; but ſweet and ſtrong wines are highly prejudicial, as is alſo exceſſive ſmoking tobacco. Change of air and travelling may be beneficial.

For the madneſs proceeding from the bite of a mad dog, ſee HYDROPHOBIA.

MADREPORA, in botany, a genus of ſubmarine plants, of a ſtony hardneſs, but ſomewhat approaching to the form of other vegetables: it is compoſed of a main ſtem, and ſubdivided into a number of branches, which are full of holes or pores, in a radiated form.

MADRIER, in the military art, a long and broad plank of wood, uſed for ſupporting the earth in mining and carrying on a ſap, and in making coffers, caponiers, galleries, and for many other uſes at a ſiege. Madriers are alſo uſed to cover the mouths of petards, after they are loaded, and are fixed with the petards to the gates or other places deſigned to be forced open.

MADRIGAL, in the Italian, Spaniſh, and French poetry, is a ſhort amorous poem, compoſed of a number of free and unequal verſes, neither confined to the regularity of a ſonnet, nor to the point of an epigram, but only conſiſting of ſome tender and delicate thought, expreſſed with a beautiful, noble, and elegant ſimplicity. The madrigal is uſually conſidered as the ſhorteſt of all the leſſer kinds of poetry, except the epigram: it will admit of fewer verſes than either the ſonnet or the roundelay; no other rule is regarded in mingling the rhimes, and the different kinds of verſe, but the fancy and convenience of the author: however, this poem allows of leſs licenſe than many others, both with reſpect to rhime, meaſure, and delicacy of expreſſion.

MÆMACTERION, *μαιμακτηριων*, in ancient chronology, the fourth month of the Athenian year, conſiſting of only twenty-nine days, and anſwering to the latter part of September and the beginning of October.

MAGAS, in ancient muſic, the name of two inſtruments, the one a ſtringed kind, and the other a kind of flute, which is ſaid to have yielded very high and very low ſounds at the ſame time.

MAGAS alſo ſignifies the bridge of any inſtrument.

MAGAZINE, a place in which ſtores are kept of arms, ammunition, proviſions, &c. Every fortified town ought to be furniſhed with a large magazine, which ſhould contain ſtores of all kinds, ſufficient to enable the garriſon and inhabitants to hold out a long ſiege, and in which ſmiths, carpenters, wheelwrights, &c. may be employed in making every thing belonging to the artillery, as carriages, waggons, &c.

MAGAZINE *of a Ship of War*, a ſmall ſtore-houſe in the after or fore part of a ſhip's hold, where the

the gun-powder is ſtowed, and filled into cartridges, bombs, grenadoes, &c. by the gunner and his mates, ready for engagement.

MAGDALEN, or *Nuns of St.* MAGDALEN, an order of religious in the Romiſh church, dedicated to St. Mary Magdalen, and ſometimes called Magdalenettes. Theſe chiefly conſiſt of courtezans, who quitting their profeſſion, devote the reſt of their lives to repentance and mortification.

MAGI, or MAGIANS, an ancient religious ſect in Perſia, and other eaſtern countries, who maintained, that there were two principles, the one the cauſe of all good, the other the cauſe of all evil; and abominating the adoration of images, worſhiped God only by fire, which they looked upon as the brighteſt and moſt glorious ſymbol of Oromaſdes, or the good god; as darkneſs is the trueſt ſymbol of Arimanius, or the evil god. This religion was reformed by Zoroaſter, who maintained that there was one ſupreme independant Being; and under him two principles or angels, one the angel of goodneſs and light, and the other of evil and darkneſs; that there is a perpetual ſtruggle between them, which ſhall laſt to the end of the world; that then the angel of darkneſs and his diſciples ſhall go into a world of their own, where they ſhall be puniſhed in everlaſting darkneſs; and the angel of light and his diſciples ſhall alſo go into a world of their own, where they ſhall be rewarded in everlaſting light.

The prieſts of the magi, were the moſt ſkilful mathematicians and philoſophers of the ages in which they lived, inſomuch, that a learned man and magian became equivalent terms. The vulgar looked on their knowledge as more than natural, and imagined them inſpired by ſome ſupernatural power; and hence, thoſe who practiſed wicked and miſchievous arts, taking upon themſelves the name of magians, drew on it that ill ſignification which the word magician now bears among us.

This ſect ſtill ſubſiſts in Perſia, under the denomination of Gaurs, where they watch the ſacred fire with the greateſt care, and never ſuffer it to be extinguiſhed. See the article GAURS.

MAGIC, originally ſignified only the knowledge of the more ſublime parts of philoſophy; but as the magi likewiſe profeſſed aſtrology, divination, and ſorcery, the term magic became odious, being uſed to ſignify an unlawful diabolical kind of ſcience, acquired by the aſſiſtance of the devil and departed ſouls.

Natural magic is only the application of natural philoſophy to the production of ſurpriſing, but yet natural effects. The common natural magic, found in books, gives us only ſome childiſh and ſuperſtitious traditions of the ſympathies and antipathies of things, or of their occult and peculiar properties, which are uſually intermixed with many trifling experiments, admired rather for their diſguiſe than for themſelves. See EXPERIMENTAL PHILOSOPHY.

MAGIC *Square*, a ſquare figure formed of a ſeries of numbers in arithmetical progreſſion, diſpoſed into ſuch parallel and equal ranks, as that the ſums of each row, as well diagonally as laterally, ſhall be equal.

MAGISTERY, in chemiſtry, commonly denotes a white powder, prepared of certain ſubſtances by precipitation. Theſe ſubſtances are either of the mineral kind, as earth, ſtones, &c. or vegetables, as herbs, reſins, &c. or animals, as bones, horns, and cruſtaceous parts.

The method of preparing it is thus: take the ſubſtance from which you deſign to prepare the magiſtery, and bruiſe or break it groſly; then pour thereon a proper liquor, an acid, &c. in order to its ſolution or extraction. The ſolution is precipitated by an affuſion of the liquor, or by the matter by whoſe force that of the ſolvent is blunted: the precipitated powder may be waſhed, if neceſſary, with common water, and afterwards gently dried.

MAGISTERY *of Biſmuth*, is made by diſſolving biſmuth in ſpirit of nitre, and pouring on it ſalt water, which precipitates the magiſtery to the bottom.

MAGISTERY *of Lead*, is made by diſſolving ſaccharum ſaturni in diſtilled vinegar, and then precipitating it with oil of tartar per deliquium.

MAGISTERY *of Reſins*, or reſinous extracts of ſcammony, jalap, &c. are made by diſſolving the matter in ſpirit of wine, and precipitating it with water.

Mr. Boyle takes magiſtery to conſiſt in a preparation of a body, whereby it is converted, by means of ſome additament, into a body of a different kind, as when iron or copper is turned into cryſtals of Mars and Venus.

MAGISTRATE, any public officer to whom the executive power of the law is committed, either wholly, or in part.

MAGNA CHARTA, the great charter of the liberties of England, and the baſis of our laws and privileges.

This charter may be ſaid to derive its origin from king Edward the Confeſſor, who granted ſeveral privileges to the church and ſtate, by charter: theſe liberties and privileges were alſo granted and confirmed by king Henry I. by a celebrated great charter, now loſt; but which was confirmed or reenacted by king Henry II. and king John. Henry III. the ſucceſſor of this laſt prince, after having cauſed twelve men to make enquiry into the liberties of England in the reign of Henry I. granted a new charter, which was the ſame as the preſent magna charta; this he ſeveral times confirmed, and as often broke; till in the thirty-ſeventh year of his reign, he went to Weſtminſter-hall, and there, in the preſence of the nobility and biſhops, who held lighted candles in their hands, magna charta was read, the king all the while holding his hand to his breaſt, and

at laſt ſolemnly ſwearing faithfully and inviolably to obſerve all the things therein contained, &c. then the biſhops extinguiſhing the candles, and throwing them on the ground, they all cried out, "Thus let him be extinguiſhed, and ſtink in hell, who violates this charter." It is obſerved, notwithſtanding the ſolemnity of this confirmation, king Henry, the very next year, again invaded the rights of his people, till the barons entered into a war againſt him, when, after various ſucceſs, he confirmed this charter, and the charter of the foreſt, in the fifty-ſecond year of his reign. This excellent charter, ſo equitable and beneficial to the ſubject, is the moſt ancient written law in the kingdom: by 25 Edw. I. it is ordained, that it ſhall be taken as the common law; and by 43 Edw. III. all ſtatutes made againſt it are declared to be void.

MAGNESIA, or MANGANESE, in natural hiſtory. See MANGANESE.

MAGNESIA ALBA, in the materia medica, a fine white earth, ſoluble readily in all acids, the vitriolic as well as the others, into a bitter purgative liquor; and not convertible by fire into quick-lime.

This earth has not hitherto been found naturally pure or in a ſeparate ſtate: it was for ſeveral years a celebrated ſecret in the hands of ſome particular perſons abroad, till its preparation was made public by Lanciſi in the year 1717, and afterwards by Hoffman in 1722. It was then extracted from the mother-ley, or the liquor which remains after the cryſtallization, of rough nitre; either by precipitation with a ſolution of fixed alkaline ſalt; or by evaporating the liquor, and calcining the dry reſiduum, ſo as to diſſipate the acids, by which the earth had been made diſſoluble.

The magneſia, in this mother-ley, appears to have proceeded from the vegetable aſhes, which are either made ingredients in the compoſitions from which nitre is obtained, or elſe added to the elixation of the nitre: for the aſhes of different woods, burnt to perfect whiteneſs, and freed from their alcaline ſalt, were found to be of the ſame nature with the true magneſia. But as quick-lime alſo, in moſt of the German, French, and other European nitre-works, is commonly employed in large quantity, the earth obtained from the mother-leys of thoſe works is rather a calcareous earth than magneſia. What is now brought from abroad, under the name of magneſia, gives plain proof of its calcarious nature, by its burning into quick-lime, and forming a ſelenites with the vitriolic acid.

The true magneſia is obtained in great purity, from a filtered ſolution of ſal catharticus amarus; by adding a filtered ſolution of any alcaline ſalt, till a freſh addition produces no farther milkineſs. The white earth, which precipitates, is to be waſhed by repeated affuſions of hot as well as cold water, and then dried for uſe.

The magneſia is recommended by Hoffman as an uſeful antaced, a ſafe and inoffenſive laxative in doſes of a dram or two, and a diaphoretic and diuretic, when given in ſmaller doſes, as fifteen or twenty grains. Since this time, it has of late come into great eſteem among us, particularly in heart-burns, and for preventing or removing the many diſorders which children are thrown into from a redundance of acid humours in the firſt paſſages. It is preferred, on account of its laxative quality, to the teſtaceous and other abſorbent earths, which, unleſs gentle purgatives are given occaſionally to carry them off, are apt to lodge in the body, and occaſion a coſtiveneſs very detrimental to infants. It muſt be obſerved, however, that it is not the magneſia itſelf which proves laxative, but the ſaline compound reſulting from its coalition with acids: if there are no acid juices in the ſtomach to diſſolve it, it has no ſenſible operation, and in ſuch caſes it may be rendered purgative by drinking any kind of acidulous liquors after it. All the other known ſoluble earths yield with acids, not purgative, but more or leſs aſtringent compounds.

MAGNET, *Magnes*, loadſtone, in natural hiſtory, a very rich iron ore, found in large detached maſſes, of a duſky iron grey, often tinged with browniſh or reddiſh, and when broken appearing ſomething like the common emery, but leſs ſparkling. It is very heavy, conſiderably hard, of a perfectly irregular and uneven ſurface, and of a firm ſtructure, but uſually with ſome porous irregularities within. It is found in England, and all other places where there are iron mines.

The word is derived from a city in Lydia, called Magneſia, where this ſtone was firſt found.

This famous ſtone was well known to the ancients, but ſcarce any other property of it than that of its attracting iron, as we may ſee in Pliny, B. 36. c. 16. However, it appears, that they knew ſomething of its communicating virtue, particularly Plato, when deſcribing that famous chain of iron rings put together, the firſt of which was held by a magnet; and Lucretius makes mention of the ſame magnetic quality operating through the hardeſt bodies.

But we do not ſee by any paſſage in their writings, that they knew any thing of the directive virtue of the loadſtone: and we are utterly in the dark as to the time this diſcovery was firſt made, as alſo when it was applied to the uſe of navigation. It, however, appears, that this diſcovery was made before the year one thouſand one hundred and eighty.

The primary properties of the loadſtone are the following: 1. Every loadſtone has two points, called poles, which emit the magnetic virtue. 2. One of theſe poles attracts, the other repels iron, but no other body. 3. This virtue, being the third ſpecies of attraction, is communicated to iron very copiouſly by the touch, which renders it

ſtrongly

ſtrongly magnetic. 4. A piece of iron ſo touched by the loadſtone, and nicely ſuſpended on a ſharp point, will be determined to ſettle itſelf in a direction nearly north and ſouth. 5. The end of the needle touched by the ſouth pole of the ſtone, will point northwards; and the contrary. 6. Needles touched by the ſtone, will dip below the horizon, or be directed on the touched part to a point within the earth's ſurface: this is called the dipping needle. 7. This virtue may alſo be communicated to iron by a ſtrong attrition all one way. 8. Iron rods or bars acquire a magnetic virtue by ſtanding long in one poſition. 9. Fire totally deſtroys this virtue, by making the ſtone or iron red hot. 10. This power is exerted ſenſibly to the diſtance of ſeveral feet. 11. It is ſenſibly continued through the ſubſtance of ſeveral contiguous bodies or pieces of iron. 12. It pervades the pores of the hardeſt body. And, 13. equally attracts the iron in vacuo as in open air. Theſe and many more are the properties of a body, not more wonderful than uſeful to mankind. See the articles POLE, NEEDLE, VARIATION, &c.

The cauſe of the variation of the needle has remained hitherto without any demonſtative diſcovery; yet ſince its declination, and inclination, or dipping, do both of them manifeſtly indicate the cauſe to be ſomewhere in the earth, it has given occaſion to philoſophy to frame hypotheſes for a ſolution, which makes the earth a large or general magnet or loadſtone, of which all the leſſer ones are but ſo many parts or fragments, and being poſſeſſed of the ſame virtue, will, when left to move freely, have the ſame diſpoſition and ſimilarity of poſition, and other circumſtances.

The moſt conſiderable of theſe hypotheſes is that of the late ſagacious Dr. Halley, which is this: the globe of the earth is one great magnet, having four magnetical poles or points of attraction, near each pole of the equator two; and that in thoſe parts of the world which lie near adjacent to any one of thoſe magnetical poles, the needle is chiefly governed thereby, the neareſt pole being always predominant over the more remote one. Of the north poles, that which is neareſt to us he ſuppoſes to be in the meridian of the land's end, which governs the variations in European Tartary and the North Sea; the other he places is a meridian paſſing through California, about 15 degrees from the north pole of the world, which governs the needle in North America, and the oceans on either ſide. In like manner he accounts for the variations in the ſouthern hemiſphere. See Philoſophical Tranſactions, N°. 148.

The variation of the needle from the north and ſouth points of the horizon not being the ſame, but variable in different years, and in a diverſe manner, in different parts of the earth, made the doctor farther conjecture, that two of the magnetic poles were fixed, and two moveable; and in order to make this out, he ſuppoſes the external part of the earth to be a ſhell or cortex, containing within it a magnetic moveable nucleus of a globular form, whoſe center of gravity is the ſame with that of the earth, and moveable about the ſame axis.

Now, if the motions of both the ſhell and nucleus were the ſame, the poles of each would always have the ſame poſition to each other; but he ſuppoſes the motion of the nucleus to be a very ſmall matter leſs than that of the ſhell, which yet is ſcarce ſenſible in 365 revolutions; and, if ſo, the magnetic poles of the nucleus will by ſlow degrees change their diſtance from the magnetic poles of the ſhell, and thus cauſe a variation in that needle's variation, which is governed by the moveable pole of the nucleus, while that variation which reſpects the fixed poles of the magnetic ſhell remains more conſtant; as in Hudſon's-bay the change is not obſerved to be near ſo faſt as in theſe parts of Europe.

The variation of the needle has, within a century paſt, undergone a remarkable alteration; for at London it was obſerved by Mr. Burrows, in the year 1580, to be 11° 15′ eaſt; after that, in the year 1622, it was obſerved by Mr. Gunter to be but 6° eaſt. In the year 1634, Mr. Gellibrand obſerved it to be 4° 5′ eaſt. In 1657, it was obſerved by Mr. Bond to be nothing at all, that is, the needle pointed directly to the north. After this, in the year 1672, Dr. Halley obſerved it to be 2° 30′ weſtward; and again, in the year 1692, he found it 6° weſt. Since then, in the year 1722, Mr. Graham, by moſt accurate experiments, found it to be 14° 13′, and at preſent it is between 19 and 20 degrees; and in ſome places it has been found to be 23° weſtward.

The ingenious Muſchenbroek has, with indefatigable pains and application, made experiments of the attractions and repulſions of loadſtones in reſpect to iron and to each other, but could never find any regular proportion in the increaſe of attraction in their approach to, or decreaſe of attraction in their receſs from, one another; only that the force of the magnetic virtue did increaſe in the approach to, and diminiſh in the receſs from, the ſtone, but not exactly as the diſtance, nor as the ſquare or cube of the diſtance, nor as the ſquare or cube of the diſtance reciprocally, nor in any proportion reducible to numbers; and therefore he very reaſonably conjectures, that the repulſions and attractions diſturb one another, ſo as to confound the proportion; nor are we able to hope for any other rule concerning this matter, till a way be found, if ever it can be, of ſeparating the attracting from the repelling parts.

The poles of a loadſtone are not to be looked upon as two ſuch invariable points as never to change place; for according to Mr. Boyle, the poles of a little bit of magnet may be changed by applying them to the more vigorous poles of another, as has been confirmed by Dr. Knight, who

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can change at pleaſure the poles of a natural magnet, by means of iron bars magnetically impregnated. Upon gently cutting a magnet through the middle of its axis, each piece becomes a compleat magnet; for the parts that were contiguous under the equator before the magnet was cut, become poles, and even poles of different names; ſo that each piece may become equally a north or ſouth-pole, according as the ſection was made nearer the ſouth or north-pole of the large magnet; and the ſame thing would happen in any other ſub-diviſions. But upon cutting a magnet longitudinally, there will then be four poles, the ſame as before the cutting; only that there ſhall be formed in each piece a new axis parallel to the former, and more or leſs in the inſide of the magnet. We find by experience, that two magnets attract each other by the poles of different denominations; whereas, on the contrary, the two ſimilar poles repel each other.

By a great number of experiments we alſo learn that the force of a magnet in attraction and repulſion reaches ſometimes farther, ſometimes not ſo far. The activity of ſome reaches to 14 feet, and that of others is inſenſible within 8 or 9 inches; the ſphere of activity is greater on certain days than on others, without its ever appearing that the heat, moiſture, or drought of the air contribute any thing to this effect.

No ſolid or fluid body can any way hinder the mutual action of iron and a magnet upon each other, unleſs it be iron itſelf: nor does the exceſſive heat of iron diminiſh theſe effects, though the exceſſive heat of a magnet diminiſh its virtue, at leaſt for a time.

The attraction of a magnet newly dug out of a mine, makes it to take up only very ſmall pieces of iron; for which reaſon it muſt be armed in order to augment its force: beſides this, the arming it unites, directs, and condenſes its virtue towards its poles, and cauſes its emanations to tend entirely towards the maſs which is laid thereon.

When you have determined where the poles are, which you may exactly find by placing over the magnet a very fine ſhort needle, which will ſtand perpendicular over each pole, and no where elſe; then you muſt file it very ſmooth at its poles, ſo that the axis ſhall have the greateſt length, yet without too much diminiſhing its other dimenſions. To determine the proportions of the armour, the greater the force of the magnet is, the thicker muſt the pieces of ſteel be of which it is to conſiſt; and for this purpoſe try the magnet with ſeveral ſteel-bars, and the greater weigh it takes up with a ſteel-bar on, that bar is to be its armour. Though the attraction of an armed magnet appears conſiderable, yet very weak cauſes deſtroy its effect in a moment; for inſtance, when an oblong piece of iron is attracted under the pole of an excellent magnet, and the pole of a different denomination in another magnet that is weaker is preſented to the lower end of this piece of iron, this weaker magnet will very ſtrongly take away the iron. In like manner, if the point of a needle be put under one of the poles of a magnet ſo as to hang by its head, and preſent to this head any bar of iron by its upper end, the needle will immediately quit the magnet, in order to adhere to the bar; but if the needle hold by its head to the pole of the magnet, then neither the bar of iron nor a weak magnet ſhall diſengage it; and there is another ſlight circumſtance which makes an armed and vigorous loadſtone appear to have no more force, and that is the two great length of the iron which is to be raiſed by one of the poles.

In order to communicate the magnetic virtue effectually, theſe methods are made uſe of: 1. It has been diſcovered that iron rubbed upon one of the poles of the magnet, acquires a great deal more virtue than from any other part thereof, and this is more conſiderable from an armed than a naked magnet. 2. The more gently the iron is preſſed, and the more it is preſſed againſt the pole, the more magnetical it becomes. 3. It is more convenient to impregnate iron on one pole than on both ſucceſſively. 4. The iron is much better impregnated by preſſing it uniformly, and in the ſame direction, according to its length, than by rubbing it by the middle; and the extremity which touches the pole laſt, retains the moſt virtue. 5. A piece of poliſhed ſteel, or a bit of pointed iron, receives more virtue than a ſimple piece of iron of the ſame figure; and, *cæteris paribus*, a piece of iron that is long, ſmall and pointed, is more ſtrongly impregnated than that of any other form.

The communication of the magnetic virtue does not ſenſibly impair that of the loadſtone; though it has been obſerved that ſome magnets have communicated a greater power to iron to raiſe weights, than they had themſelves, but without impairing their own force, or adding any thing to the weight of the iron.

As ſeveral ways have been propoſed for recovering the decayed virtue of loadſtones, but to little purpoſe, eſpecially that of keeping the ſtone conſtantly in ſteel filings, we ſhall here relate the remarkable experiment of Mr. Haac for this purpoſe, as it was attended with great ſucceſs. This gentleman had a magnet weighing fourteen ounces and a half, armed, which would take up ſixteen times its own weight; but having laid it by for ſome years unuſed, it loſt one fourth part of its virtue, or more; whereupon he hung as much weight to the ſtone as it would ſuſtain, and ſo left it for ſome weeks; then returning, he applied more weight to the former, which it very eaſily bore, and then repeating the addition of more weight at ſeveral periods, in the ſpace of about two years, he found that the

ſtone had not only recovered its former ſtrength, but increaſed it ſo far, that it would now take up more than twenty pounds, whereas at firſt it would not take up fifteen.

Artificial MAGNET, a ſteel bar impregnated with the virtues of the magnet, ſo as to poſſeſs all the properties, and be uſed inſtead of the natural loadſtone.

There have been ſeveral methods propoſed for making artificial magnets, but none has yet met with greater ſucceſs than that of Mr. Canton's a gentleman well known in the learned world, and to whom we owe this diſcovery.

Procure a dozen of bars, ſix of ſoft ſteel, each three inches long, one quarter of an inch broad, and one twentieth of an inch thick; with two pieces of iron, each half the length of one of the bars, but of the ſame breadth and thickneſs: alſo ſix pieces of hard ſteel, each five inches and a half long, half an inch broad and three twentieths of an inch thick; with two pieces of iron, of half the length, but the whole breadth and thickneſs of one of the hard bars; and let all the bars be marked with a line quite round them at one end. Then take an iron poker and tongs, (pl. LXIX. *fig.* 3.) or two bars of iron, the larger they are, and the longer they have been uſed, the better; and fixing the poker upright between the knees, hold to it, near the top, one of the ſoft bars, having its marked end downwards, by a piece of ſewing ſilk, which muſt be pulled tight by the left hand, that the bar may not ſlide: then graſping the tongs with the right hand, a little below the middle, and holding them nearly in a vertical poſition, let the bar be ſtroked by the lower end from the bottom to the top, about ten times on each ſide, which will give it a magnetic power ſufficient to lift a ſmall key at the marked end; which end, if the bar was ſuſpended on a point, would turn towards the north, and is therefore called the north pole, and the unmarked end is, for the ſame reaſon, called the ſouth pole. Four of the ſoft bars being impregnated after this manner, lay the two (*fig.* 1.) parallel to each other, at the diſtance of one fourth of an inch, between the two pieces of iron belonging to them, a north and a ſouth pole againſt each piece of iron: then take two of the four bars already made magnetical, and place them together ſo as to make a double bar in thickneſs, the north pole of one even with the ſouth pole of the other; and the remaining two being put to theſe, one on each ſide, ſo as to have two north and two ſouth poles together; ſeparate the north from the ſouth poles at one end by a large pin, and place them perpendicularly with that end downward on the middle of one of the parallel bars, the two north poles towards its ſouth, and the two ſouth poles towards its north end: ſlide them backward and forward three or four times the whole length of the bar,

and removing them from the middle of this, place them on the middle of the other bar as before directed, and go over that in the ſame manner; then turn both the bars the other ſide upwards, and repeat the former operation: this being done, take the two from between the pieces of iron, and placing the two outermoſt of the touching bars in their room, let the other two be the outermoſt of the four to touch theſe with; and this proceſs being repeated till each pair of bars have been touched three or four times over, which will give them a conſiderable magnetic power, put the half dozen together after the manner of the four, (*fig.* 2.) and touch with them two pair of the hard bars placed between their irons, at the diſtance of about half an inch from each other; then lay the ſoft bars aſide, and with the four hard ones, let the other two be impregnated, (*fig.* 5.) holding the touching bars apart at the lower end near two tenths of an inch, to which diſtance let them be ſeparated after they are ſet on the parallel bar, and brought together again before they are taken off; this being obſerved, proceed according to the method deſcribed above, till each pair have been touched two or three times over; but as this vertical way of touching a bar will not give it quite ſo much of the magnetic virtue as it will receive, let each pair be now touched once or twice over in their parallel poſition between the irons, (*fig.* 6.) with two of the bars held horizontally, or nearly ſo, by drawing at the ſame time the north of one from the middle over the ſouth end, and the ſouth of the other from the middle over the north end of a parallel bar; then bringing them to the middle again, without touching the parallel bar, give three or four of theſe horizontal ſtrokes to each ſide. The horizontal touch, after the vertical, will make the bars as ſtrong as they poſſibly can be made, as appears by their not receiving any additional ſtrength, when the vertical touch is given by a great number of bars, and the horizontal by thoſe of a ſuperior magnetic power. This whole proceſs may be gone through in about half an hour; and each of the large bars, if well hardened, may be made to lift twenty-eight troy ounces, and ſometimes more. And when theſe bars are thus impregnated, they give to an hard bar of the ſame ſize its full virtue in leſs than two minutes; and therefore will anſwer all the purpoſes of magnetiſm in navigation and experimental philoſophy much better than the loadſtone, which is known not to have a ſufficient power to impregnate hard bars. The half dozen being put into a caſe (*fig.* 4.) in ſuch a manner as that two poles of the ſame denomination may not be together, and their irons with them as one bar, they will retain the virtues they have received: but if their power ſhould, by making experiments, be ever ſo far impaired, it may be

reſtored without any foreign aſſiſtance in a few minutes. And if, out of curioſity, a much larger ſet of bars ſhould be required, theſe will communicate to them a ſufficient power to proceed with, and they may in a ſhort time, by the ſame method, be brought to their full ſtrength.

MAGNIFYING, in philoſophy, the making of objects appear larger than they would otherwiſe do; whence convex lenſes, which have the power of doing this, are called magnifying glaſſes; and of ſuch glaſſes are microſcopes conſtructed. See LENS and MICROSCOPE.

MAGNITUDE, whatever is made of parts locally extended, or that hath ſeveral dimenſions; as a line, ſurface, ſolid, &c. See the article LINE, &c.

The apparent magnitude of a body is that meaſured by the viſual angle, formed by rays drawn from its extremes to the center of the eye; ſo that whatever things are ſeen under the ſame or equal angles, appear equal; and *vice verſa*.

MAGNOLIA, the laurel-leaved tulip-tree, in botany, a genus of plants, whoſe flower corolla conſiſts of nine oblong, obtuſe, and concave petals; the filaments are ſhort, acuminated, and numerous, terminated by linear antheræ adhering to every ſide of the filaments. The fruit is an oval ſtrobilus, compoſed of compreſſed, roundiſh, and almoſt imbricated capſules, which are unilocular, and contain a kidney ſhaped ſeed. All the ſpecies of magnolia are natives of Carolina, Virginia, or Florida, they are propagated by ſeeds, which ſhould be procured from where they grow naturally, and on their arrival ſhould be ſown immediately on a moderated hot bed, they may alſo be raiſed from layers; and could theſe beautiful trees be ſo far naturalized to our climate as to endure the ſeverity of our coldeſt winters, they would make ſome of the greateſt ornaments of our gardens.

MAHOMETANS, thoſe who believe and practiſe the religion of Mahomet.

The fundamental poſition on which Mahomet erected the ſuperſtructure of his religion, was, that there has been from the beginning of the world but one true orthodox belief, which conſiſts in acknowledging one only true God, and obeying ſuch of his meſſengers and prophets as he has from time to time ſent into the world, to reveal his will to mankind. Upon this foundation he ſat up for a prophet to extirpate idolatry, which was the religion of the Arabs, his countrymen, and to reform the other abuſes crept into religion. The whole ſubſtance of his doctrine he therefore comprehended in theſe two principal articles of faith, "There is "but one God, and Mahomet is his prophet;" in conſequence of which laſt article, all ſuch ordinances and inſtitutions as he thought fit to eſtabliſh, were to be received as obligatory and of divine authority.

The Mahometans divide their religion into two general parts, faith and practice; of which the firſt is divided into ſix diſtinct branches; belief in God, in his angels, in his ſcriptures, in his prophets, in the reſurrection and final judgment, and in God's abſolute decrees. The points relating to practice are, prayer, with waſhings, &c. alms, faſting, pilgrimage to Mecca, and circumciſion. In regard to theſe practical points, Mahomet, it is ſaid, declared, that the practice of religion is founded upon cleanlineſs, which is one half of faith, and the key of prayer. Alms-giving is thought to be ſo pleaſing in the ſight of God, that the caliph Omar Ebn Abdalaziz uſed to ſay, prayer carries us half way to God; faſting brings us to the door of his palace; and alms procure us admiſſion: and Mahomet himſelf uſed to ſay of faſting, that it was the gate of religion; and the odour of the mouth of him who faſteth is more grateful to God than that of muſk. Beſides theſe they have ſome negative precepts and inſtitutions of the koran, in which ſeveral things are prohibited, as uſury, the drinking of wine, all games that depend upon chance, the eating of blood, and ſwine's fleſh, and whatever dies of itſelf, is ſtrangled, or is killed by a blow or by another beaſt. Theſe doctrines and practices Mahomet eſtabliſhed by the ſword, by preaching, and by the alkoran or koran, which contains the principles of his religion; and he and his followers met with ſuch ſucceſs, as in a few years to ſubdue half the known world. See ALCORAN.

MAIDEN, an inſtrument uſed in Scotland for beheading of criminals.

This is a broad piece of iron about a foot ſquare, very ſharp on the lower part, and loaded above with a very heavy weight of lead. At the time of execution, it is pulled up to the top of a narrow wooden frame, about ten feet high, and as broad as the engine, with mouldings on each ſide for the maiden to ſlide in. A convenience is made about four feet from the ground, for the priſoner to lay his neck; and there is a kind of bar ſo faſtened as to keep him from ſtirring. The priſoner being thus ſecured, and the ſign given, the maiden is let looſe, which in a moment ſeparate his head from his body.

MAIDEN-ASSIZE, an aſſize in which no perſon is condemned to die.

MAIDEN-HAIR, *Adiantum*, in botany, a genus of cryptogamious plants, producing no viſible flowers; the ſeeds are a fine duſt, lying in oval ſpots about the edges of the backs of the leaves, which curl over and cover them. As the leaves of all the ſpecies of maiden-hair have one general appearance, it is eaſy to diſtinguiſh them from the other plants of the fern kind; the leaves of all the maiden hairs have a ſlight ſweetiſh roughiſh taſte, and a pleaſant but weak ſmell, very perceptible when boiling water is poured on them. This plant has long been held

held in eſteem againſt diſorders of the breaſt, for promoting expectoration, ſoftening recent coughs, and allaying the tickling in the throat, occaſioned by defluxions of the rheum; for theſe purpoſes a ſyrup of the true ſort, flavoured with a little orange flower water, has been uſually brought from France, and a ſyrup of the ſpecies which grows in Canada made with maple ſugar is ſomtimes received from America. The virtue of maiden-hair is obtainable however to much better advantage by drinking an infuſion of the herb as tea, ſweetened either with ſugar, or by the addition of a little liquorice. The Engliſh maiden-hair has been commonly ſubſtituted in the pectoral ſyrups and infuſions made among us; the Canada ſpecies, which appears to be ſuperior to the others is ſaid to have been long made uſe of in France, and has lately been introduced into practice in this country.

MAJESTY, a title given to kings, which frequently ſerves as a term of diſtinction.

MAIL, or *Coat of* MAIL, a piece of defenſive armour for the body, made of ſmall iron rings, interwoven in the manner of a net.

MAIM, MAIHEM, or MAYHEM, in law, a wound, by which a perſon loſes the uſe of a member that might have been a defence to him.

MAIN, in the ſea language, chief, principal, as the main-maſt, main-yard, main-ſail, main-hatchway, &c.

MAIN alſo implies ſome continent or great land, as oppoſed to iſland: We ſteered between the iſland and the main.

MAIN-BOWLINES. See BOWLINES.

MAIN-BRACES. See BRACES.

MAIN-HATCHWAY. See HATCHWAY.

MAIN JEARS. See JEARS.

MAIN-LIFTS. See LIFTS.

MAIN-MAST. See MAST.

MAIN-SAIL. See SAIL.

MAIN-SHROUDS. See SHROUDS

MAIN-TYE. See TYE.

MAIN-YARD. See YARD.

MAINPRISE, in law, is the receiving a perſon into friendly cuſtody, who might otherwiſe be committed to priſon, on ſecurity given that he ſhall be forth-coming at a certain time and place appointed. There is a difference between bail and mainpriſe, for a perſon mainpriſed is ſaid to be at large from the day of his being mainpriſed, till the day of his appearance, and is not liable to be confined by his ſureties: but when a perſon is let to bail by a judge, &c. till a certain day, he is in law always accounted in the ward of his bail during the time, and they may, if they pleaſe, keep him in priſon.

MAINTENANCE, in law, is an unlawful maintaining or ſupporting a ſuit between others, by ſtirring up quarrels, or interfering in a cauſe in which the perſon has no concern.

MAJOR, in the art of war, the name of ſeveral officers of very different ranks and functions; as, 1. Major-general, the next officer to the lieutenant-general: his chief buſineſs is to receive the orders from the general, or in his abſence from the lieutenant-general of the day; which he is to diſtribute to the brigade-majors, with whom he is to regulate the guards, convoys, and detachments. When there are two attacks at a ſiege, he commands that on the left. He ought to be well acquainted with the ſtrength of each brigade, of each regiment in particular, and to have a liſt of all the field officers. In ſhort, he is in the army what a major is in a regiment. He is allowed an aid-de-camp, and has a ſerjeant and fifteen men for his guard. 2. Major of a brigade, the officer who receives the orders from the major-general, and delivers them to the adjutants of the regiments at the head of the brigade; where he takes and marches the detachments, &c. to the general rendezvous. He ought to be an expert captain, to know the ſtate and condition of the brigade, and keep a roll of the colonels, lieutenant-colonels, majors, and adjutants. 3. Major of a regiment, the next officer to the lieutenant-colonel, generally promoted from the eldeſt captain. He is to take care that the regiment be well exerciſed, to ſee it march in good order, and to rally it in caſe of its being broke. He is the only officer among the foot that is allowed to be on horſeback in time of action, that he may the more readily execute the colonel's orders, either in advancing or drawing off the regiment. 4. Major of a regiment of horſe, is the firſt captain, who commands in the abſence of the colonel. 5. Town-major, the third officer in a garriſon, being next to the deputy-governor. He ought to underſtand fortification, and hath charge of the guards, rounds, patrols, &c. His buſineſs is alſo to take care that the ſoldiers arms are in good order; he likewiſe orders the gates to be opened and ſhut, and gives the governor an account of all that paſſes within the place.

There are alſo aids-major, drums-major, &c. ſo called from their preheminence above others of the ſame denomination.

MAJOR, in logic, the firſt propoſition of a ſyllogiſm. See the article SYLLOGISM.

MAJOR and MINOR, in muſic, ſignify imperfect concords, which differ from each other by a ſemi-tone minor. See CONCORD.

MAJOR-DOMO, an appellation formerly given to the ſteward or maſter of the king's houſhold.

MAJORANA, marjoram, in botany, a low plant, with ſlender, ſquare, branched, woody ſtalks, and little, oval, ſomewhat downy leaves, ſet in pairs: on the tops grow ſcaly heads of ſmall whitiſh labiated flowers, whoſe upper lip is erect and cloven, the lower divided into three ſegments. It is ſown annually in gardens, for culinary as well as medi-

cinal

cinal uſes: the ſeeds, which rarely come to perfection in England, are procured from the ſouth of France, where the plant is ſaid to be indigenous.

The leaves and tops of marjoram have a pleaſant ſmell, and a moderately warm aromatic bitteriſh taſte. Infuſions of them in water, in colour browniſh, ſmell pretty ſtrongly, and taſte weakly and unpleaſantly of the herb: the blackiſh green tinctures, made in rectified ſpirit, have leſs ſmell, but a ſtronger and more agreeable taſte. In diſtillation with water, an eſſential oil is obtained, amounting, as Hoffman obſerves, to about one ounce from ſixty-four of the leaves ſlightly dried; when carefully drawn, of a pale yellow colour; by age, or too haſty fire in the diſtillation, contracting a reddiſh hue; of a very hot penetrating taſte, and in ſmell not near ſo agreeable as the marjoram itſelf: the remaining decoction, thus diveſted of the volatile aromatic matter, is weakly, but unpleaſantly, bitteriſh and auſtere. Great part of the aromatic matter of the herb riſes alſo in the inſpiſſation of the ſpirituous tincture, and impregnates the diſtilled ſpirit: the remaining extract is ſtronger in taſte than that made with water, its quantity being leſs, but has not much of the warmth or flavour of the marjoram.

This plant has been chiefly recommended in diſorders of the head and nerves, in uterine obſtructions and mucous diſcharges proceeding from what is called a cold cauſe, that is, from a laxity and debility of the ſolids, and a ſluggiſh ſtate of the juices, and in the humoural aſthmas and catarrhs of old people. The powder of the leaves, thin diſtilled water, and the eſſential oil properly diluted, are agreeable errhines, and accounted particularly uſeful in pituitous obſtructions of the noſtrils, and diſorders of the olfactory organs.

MAJORITY, the greater number of perſons.

MAIZE, a ſpecies of grain ſo generally uſed for food in America, that it has obtained the name of Indian corn.

The ſize of its ear differs greatly, according to the fertility of the ſoil, and the warmth of the climate in which it is cultivated; but at a medium, it is about a ſpan long, and commonly has eight or more rows of grain, each of which uſually contains upwards of thirty ſeeds, of various colours, as red, white, yellow, blue, olive, greeniſh, blackiſh, ſpeckled, ſtriped, &c. ſometimes in the ſame field, and the ſame ear: but the white and yellow are the moſt common: nor does this diverſity of colours ever reach beyond the outſide of the grain, the flour of which always is white, with a little tinge of yellow. Theſe ſeeds, which are as big as large peas, are round at their outer ſurface, very ſmooth, and ſet extremely cloſe, in ſtraight lines. The ear is cloathed and armed with ſeveral ſtrong thick huſks, which defend it not only from unſeaſonable rains and the cold of the night, for it does not ripen fully in ſome places till towards the latter end of September, but alſo from crows and other birds, which, being allured by the ſweetneſs of the grain before it hardens, flock to it in great numbers, ſuck through the top of the outer covering, and devour as far as they can reach. In the northern colonies, the ſtalk of this plant, which contains a remarkable ſweet pith, and is jointed like a cane, does not grow near ſo high as in the ſouthern parts. It has long leaves, almoſt like flags, at every joint, and at top a bunch of flowers, of various colours, highly pleaſing to the eye. The northern Indians, far up in the country, have a ſpecies of this grain, called Mohawk's corn, which never grows high, and, though planted in June, ripens in due ſeaſon. The general time of planting it is between the middle of March and the beginning of June, or, more particularly, from the middle of April to the middle of May.

This plant is ſeldom cultivated in England for uſe, though it might probably turn to good account, as was lately experienced by a gentleman in Lincolnſhire, who planted this corn in an open field, where it ripened perfectly, and yielded an abundant crop. Large quantities of it are raiſed in Aſia and Africa, in ſeveral parts of France, in Italy, and North America.

The Engliſh in North-America plough the ground thoroughly before the grain is planted. They ſeldom, if ever, dung the whole face of the field, but ſometimes put a little dung in each hill of corn, if they think the ground requires it.

In order to plant the corn, they make trenches or furrows, with a plough, acroſs the field, at certain diſtances from each other, and croſs theſe with others of the ſame diſtance, which divide the field into ſquares; and where the trenches interſect, the grain is put in, and covered. Three or four grains are commonly planted for each hill. The intermediate ground is afterwards ploughed at leiſure, as the plants grow, and want more looſe earth for the roots to ſpread in. The hills are made at the time of weeding; ſome looſe earth being then hoed up over the roots, and round the ſtems or ſtalks of the corn.

The corn is planted at different diſtances in different places. In the north colonies the maize grows low, ſeldom exceeding four or five feet in height; and the leaves being proportionable ſmall, the plants do not require ſo much ground as in the ſouthern colonies, where they frequently riſe to fourteen or fifteen feet. The ſpace generally allowed for the loweſt plants is three feet, and for the higheſt, five or ſix.

The panicles, or toſſils, contain the *farina fecundans* of the plant, and therefore ſhould not be cut off till the grain in the ear is filled. If the toſſils of a whole field ſhould be cut off before that time, there would be no grain at all in the ears. This has been proved by experience.

In the more ſouthern colonies, where hay is

ſcarce, and the leaves of this corn are very large, they cut them off for fodder; but in the northern colonies, where there is plenty of hay, and the leaves of the corn are ſmall, they generally neglect cutting off the toſſils, and ſtripping off the leaves. They are left on the ſtalks, and the cattle being turned into the fields, after the corn is gathered in, eat what they like of them; but they are not eſteemed ſo good as what has been cut in ſeaſon.

An eaſy way of taking the grain out of the ears, is, to rub one againſt another, holding one in each hand.

When the ears are ſtripped off their huſks, they are reckoned in the beſt ſtate for preſervation; much better than when the grain is rubbed off from the ear; for then, ſay they, inſects can get at the ſoft part of the grain, and eat into it; which they cannot do while the ſoft part is connected with the cob in the ear, and the hard flinty part of every grain turned outward, and the grains cloſe to each other.

The manner of uſing this corn in America is various. It has this advantage over wheat, that ſubſtance may be drawn from your corn-fields long before the general harveſt; for the green ears roaſted are delicate food; and as the corn ripens and grows harder, the ears boiled are good eating with butter and ſalt. When it is ripe, the corn, parched and ground into meal, is the hunting and war proviſion of the Indians; being light to carry, and affording good nouriſhment. They mix a little of it with water, and it needs no other cooking, having already paſſed the fire in the parching. The grain ſoaked in water will part with its ſkin when beat in a large morter with a wooden peſtle; then it is boiled and eaten with milk. Being pounded coarſely, dry, it is alſo boiled and eaten as rice. Bag puddings, and baked puddings made of it properly, are very good. The meal is alſo boiled with water, to make what they call a haſty-pudding, which they eat with butter and ſugar, or with milk. This haſty-pudding or boiled meal, being mixed with twice as much dry wheat flour, and worked into loaves, makes much better and pleaſanter bread than flour alone.

MAKING-UP, among diſtillers, the reducing ſpirits to a certain ſtandard of ſtrength, uſually called proof, by the admixture of water; which ſhould be either ſoft and clear-river water, or ſpring water rendered ſoft by diſtillation.

MALACHI, or *the Prophecy of* MALACHI, a canonical book of the Old Teſtament, and the laſt of the twelve prophets. Malachi propheſied about three hundred years before Chriſt reproving the Jews for their wickedneſs after their return ſom Babylon, charging them with rebellion, ſacrilege, adultery, prophaneneſs, and infidelity, and condemning the prieſts for being ſcandalouſly careleſs in their miniſtry; at the ſame time not forgetting to encourage thoſe pious few, who in that corrup tage, maintained their integrity. This prophet diſtinctly points at the Meſſiah, who was ſuddenly to come to his temple, and to be introduced by Elijah the prophet, that is, by John the Baptiſt, who came in the ſpirit and power of Elias or Elijah.

MALACHITES, or MOLOCHITES, in natural hiſtory, &c. a ſpecies of jaſper, ſuppoſed to be poſſeſſed of amuletic virtues. See JASPER and AMULET.

MALACIA, μαλακια, in medicine, is a languiſhing diſorder incident to pregnant women, in which they long ſometimes for one kind of food, and ſometimes for another, and eat it with an extraordinary greedineſs. When women labouring under this diſorder begin to abſtain from the improper and abſurd things they were fond of, and with leſs reluctance uſe laudible and wholeſome aliments, it is an infallible ſign of a beginning cure and approaching health. Pregnant women are generally freed from the malacia about the fourth month; but if it continues longer it is dangerous becauſe the peccant humours are deeply rooted. For the cure of this diſorder in pregnant women, but few medicines are recommended, for fear of abortion; however, gentle medicines may be uſed for evacuating and corroborating the ſtomach. In young women labouring under a chloroſis, this diſtemper is cured by the ſame medicines that are proper for removing the chloroſis. See the article CHLOROSIS.

MALACOPTERYGIOUS, among ichthyologiſts, an appellation given to one of the five orders of fiſhes, from their having the ray of their fins bony, but not pointed or ſharp at the extremities, like thoſe of acanthopterygious fiſhes. See the articles FISH and ICHTHYOLOGY.

MALACOSTOMOUS FISHES, thoſe deſtitute of teeth in the jaws, called in Engliſh leather-mouthed; as the tench, carp, bream, &c.

MALAGMA, a cataplaſm. See the article CATAPLASM.

MALANDERS, in farriery, are cracks in the bend of a horſe's knee, that diſcharge a ſharp indigeſted matter; they are often the occaſion of lameneſs, ſtiffneſs, and the horſe's tumbling.

This diſtemper is cured by waſhing the parts with a lather of ſope warmed, or old chamber-ley; and then applying over the cracks a ſtrong mercurial ointment ſpread on tow, with which they ſhould be dreſſed, night and morning, till all the ſcabs fall off: if this ſhould not ſucceed, anoint them night and morning with a little of the following, and apply the above ointment over it.

Take of Æthiops mineral half an ounce; white vitriol one dram; ſoft green ſope ſix ounces. Anoint with this often, but firſt clip away the hair,

and clear the ſcabs. On their drying up, it may be proper to give a gentle purge or two; or the nitre-balls may be taken advantageouſly for a fortnight or three weeks.

MALE, *Mas*, among zoologiſts, that ſex of animals which have the parts of generation without the body. See the articles ANIMAL, SEX, and GENERATION.

The term male has alſo, from ſome ſimilitude to that ſex in animals, been applied to ſeveral inanimate things: thus we ſay, a male flower, a male ſcrew, &c. See the articles FLOWER and SCREW.

MALICE, in law, is a premeditated deſign to do miſchief to another.

MALIGNANT, among phyſicians, a term applied to diſeaſes of a very dangerous nature, and generally infectious: ſuch are the dyſentery, hoſpital fever, &c. in their worſt ſtages.

MALL, or SEA-MALL, in ornithology, the Engliſh name of the leſſer gull, with a grey back and ſpotted neck, and about the ſize of the common tame pigeon.

MALLEABLE, a property of metals, whereby they are capable of being extended under the hammer. See the articles DUCTILITY and METAL.

MALLEOLUS, in anatomy, a name given by anatomiſts to the inferior extremities of the tibia and fibula.

MALLET, a kind of large wooden hammer, uſed by artificers who work with a chiſſel, as ſculptors, maſons, and ſtone-cutters, whoſe mallets are commonly round; and by joiners, carpenters, &c. who work with ſquare-headed mallets.

Caulking MALLET, a mallet uſed by caulkers to drive oakum into the ſeams of a ſhip. See the article CAULKING.

Serving MALLET, among ſailors, a mallet uſed in ſerving ropes. See the article SERVICE.

The uſe of the mallet is to bind the ſpun-yarn or other line very tight about the rope, to prevent it from being chafed by friction; two or three turns of the ſpun-yarn, for this purpoſe, are wound about the body of the mallet, and while one man paſſes the ſpun yarn ball, another binds the turns of it on the rope, by turning the mallet round it, which draws it very tight.

MALLEUS, in anatomy, a bone of the ear, ſo called from its reſemblance to a mallet, and in which is obſerved the head, the neck and handle, which is joined to the membrane of the tympanum. See EAR.

MALLOW, *Malva*, in botany, a genus of plants, whoſe flower conſiſts of five petals, vertically cordated, plane and coaleſcing at their baſe; the filaments are numerous, and topped with reniform antheræ: the fruit conſiſts of a number of capſules, joined together by an articulation, and of an orbicular depreſſed figure, ſeparating from one another, and opening inwardly: the receptacle, affixed to the capſules, is columnar, and the ſeed is ſolitary and kidney-ſhaped.

The common mallow is ſo well-known as to require no deſcription; it is one of the five emollient herbs, being looſening, cooling, and mollifying: a cataplaſm of the leaves of this plant, eaſes the ſting of bees or waſps.

Marſh-MALLOW, *Althæa*. See ALTHÆA.

Tree-MALLOW. See LAVATERA.

Vervain-MALLOW. See ALCEA.

MALMSEY, a rich kind of wine, ſo called, as being brought from Malvaſia, in the Morea.

MALOPE, in botany, a genus of plants the flower of which is like that of the common mallow; the fruit is compoſed of many cells, which are collected in a head, each containing a kidney-ſhaped ſeed.

MALPHIGHIA, in botany, a genus of plants, the flower of which is compoſed of five large, hollow, kidney-ſhaped petals, with long and linear ungues: the ſtamina are ten broad ſubulated filaments, topped with heart-ſhaped antheræ: the fruit is a large globoſe berry, containing oſſeous, oblong, obtuſe, and angulated ſeeds, each having an oblong and obtuſe kernel.

MALT, is barley prepared, to fit it for making a potable liquor called beer, or ale, by ſtopping it ſhort in the beginning of vegetation.

In making malt from barley, the uſual method is to ſteep the grain in a ſufficient quantity of water, for two or three days, till it ſwells, becomes plump, ſomewhat tender, and tinges the water of a bright brown, or reddiſh colour. Then, this water being drained away, the barley is removed from the ſteeping-ciſtern to the floor, where it is thrown into what is called the wet couch; that is, an even heap, riſing to the height of about two feet. In this wet couch, the capital part of the operation is performed; for here the barley ſpontaneouſly heats, and begins to grow, ſhooting out firſt the radicle, and if ſuffered to continue, then the plume, ſpire or blade. But the proceſs is to be ſtopped ſhort at the eruption of the radicle, otherwiſe the malt would be ſpoiled. In order to ſtop it, they ſpread the wet couch thin over a large floor, and keep turning it once in four or five hours, for the ſpace of two days, laying it ſomewhat thicker each time. After this, it is again thrown into a large heap, and there ſuffered to grow ſenſibly hot to the hand, as it uſually will in twenty or thirty hours time; then being ſpread again, and cooled, it is thrown upon the kiln to be dried criſp without ſcorching.

This is the general proceſs of malting, in which almoſt every malſter has his ſecret, or particular way of working. But to render the operation perfect, the following cautions muſt be obſerved: 1. That the barley be newly threſhed, or at leaſt newly winnowed. 2. That it be not mixed, or made up of different ſorts. 3. That it be not over ſteeped in

the ciſtern, or ſo long as to make it ſoft. 4. That it be well drained. 5. That it be carefully looked after in the wet couch, ſo as to ſtop the firſt tendency of the blade to ſhooting. 6. Another caution is, to turn the wet couch inſide outermoſt, if the barley comes, and ſhoots more in the middle of the heap than on the ſides. 7. To keep it duly turning, after it is out of the wet couch. 8. To give it the proper heating in the dry heap. 9. To dry and criſp it thoroughly upon the kiln, but without a fierce fire, ſo as to be ſeveral days in drying a kiln of pale malt. And if theſe directions be carefully obſerved, the malt will always be good.

The method of malting Indian corn, or Virginia wheat, is much leſs laborious; for if this corn be buried two or three inches deep in the earth, and covered with the looſe mould dug up to make room for it, in ten or twelve days the corn will ſprout and appear like a green field; at which time, being taken up, and waſhed or fanned from its dirt, it is immediately committed to the kiln, and by this means it becomes good malt. It is obſervable of this corn, that both its root and blade muſt ſhoot to a conſiderable length, before it will make malt; and perhaps this is the caſe in all large-bodied grain.

The importation of malt from beyond the ſeas is prohibited: and on its being exported, it is not only freed from paying the exciſe of 6*d.* a buſhel, but a bounty is allowed by act of parliament, for which ſee the article CORN.

Malt-liquors have different names, and different virtues, from the different methods of preparing the malt, whence they are diſtinguiſhed into pale and brown; and from the various methods taken in brewing the liquors, whence they are divided into ale and beer, ſtrong and ſmall, new and old. See BREWING.

The colour of the liquor, and many of its effects, depend on the manner of drying the malt it is brewed with; that which has the paleſt tinge, is made with malt but ſlenderly dried; whereas, that which is high coloured, is made with malt that is high dried, or roaſted, as it were, in compariſon of the other; and amber ale is made of a mixture of both.

Another difference in the preparations of malt-liquors conſiſts in the larger quantity of hops in beer, and the ſmaller in ale; for hops add ſomething of an alkaline nature to the liquor, and not only render it more eaſy of digeſtion and ſecretion of the body, but while it is in the liquor, prevent its running into ſuch coheſions as would make it ropy, vapid, and ſour. For this reaſon, Dr. Quincy is of opinion, that for one conſtitution injured by beer, there are numbers ſpoiled by ale, which is apt to ſtuff the veſſels with ſlime and viſcidity, to make the body unweildy and corpulent, and to pave the way for cachexies, the jaundice, aſthmas, and the dropſy. The different degrees of ſtrength in malt-liquors alſo make them produce different effects. The ſtronger they are, the more viſcid part they carry into the blood: they are therefore, in general, the more wholeſome for being ſmall; that is, of ſuch a ſtrength as to carry ſome degree of warmth into the ſtomach, but not ſo as to prevent their being proper diluters of our neceſſary food. Indeed, people of robuſt conſtitutions, who labour very hard, may diſpenſe with reaſonable quantities of the ſtrongeſt; eſpecially as their food is frequently poor and ſlender enough, the deficiencies of which this ſupplies; and their continual exerciſe and ſtrength of body, digeſts and breaks the viſcidities of the drink into convenient nouriſhment: though, in perſons of another habit and way of living, they would only produce obſtructions and ill humours. As to the age of theſe liquors, it has ſomewhat the ſame effect as hops, for thoſe that are longeſt kept, are certainly leaſt viſcid; for age, by degrees, breaks their viſcid parts, and by rendering them ſmaller, makes them fitter for ſecretion.

MALT-SPIRITS. See the articles DISTILLERY and SPIRITS.

Knights of MALTA, otherwiſe called *Hoſpitallers of St. John of Jeruſalem*, a religious military order, whoſe reſidence is in the iſland of Malta. The order conſiſts of three eſtates, the knights, chaplains, and ſervants at arms: there are alſo prieſts who officiate in the churches, friar-ſervants, who aſſiſt at the offices, and donnes or demicroſſes; but theſe are not reckoned conſtituent parts of the body: the government of the order is mixed, being partly monarchical, and partly ariſtocratical: the grand maſter is ſovereign. The knights formerly conſiſted of eight different languages, but now only ſeven, the Engliſh having withdrawn themſelves. None are admitted into this order but ſuch as are of noble birth: the knights are of two ſorts, thoſe who have a right to be candidates for the dignity of grand maſter, called grand-croſſes, and thoſe who are only knights aſſiſtants: they never marry, yet have continued from 1090 to the preſent time. The knights are received into this order either by undergoing the trials preſcribed by ſtatutes, or by diſpenſation.

MALTHA, in antiquity, a kind of cement, of which there were two ſorts, native and factitious; one of the latter ſort, much in uſe, conſiſted of pitch, wax, plaſter, and greaſe. Another kind uſed by the Romans in their aqueducts, was made of lime ſlacked in wine, incorporated with melted pitch, and freſh figs. Natural maltha is a kind of bitumen, wherewith the Aſiatics plaſter their walls; and which being once ſet on fire, water makes it burn more fiercely.

MALVA, mallows. See MALLOWS.

MALUS, the apple-tree, in botany. See the article APPLE.

MAMALUKES, the name of a dynaſty that reigned in Egypt.

The

The Mamalukes were originally Turkiſh and Circaſſian ſlaves, bought of the Tartars by Melic-ſaleh, to the number of a thouſand, whom he bred up to arms, and raiſed ſome to the principal offices of the empire. They killed ſultan Moadam, to whom they ſucceeded.

Others ſay, that the Mamalukes were ordinarily choſen from among the Chriſtian ſlaves, and that they were the ſame thing in a great meaſure with the Janiſſaries among the Turks. They never married. They firſt are ſaid to have been brought from Circaſſia, and ſome have ſuppoſed that they began to reign about the year 869.

MAMMÆ, the breaſts, in anatomy, two eminences, more or leſs round, ſituated in the anterior, and a little towards the lateral parts of the thorax; their middle part lying almoſt oppoſite to the bony extremity of the ſixth rib on each ſide.

In children of both ſexes, and in males of all ages, they are commonly no more than cutaneous tubercles, or ſoft vertucæ of a roundiſh colour, called papillæ, or nipples; each of them being ſurrounded by a ſmall, thin, and pretty broad circle, more or leſs of a browniſh colour, and an uneven ſurface, termed areola.

In females, when come to the age of puberty, which is ſometimes ſooner, ſometimes later, a third part is joined to the two former, which is a convex protuberance more or leſs round, of about five or ſix fingers in breadth, the papilla and areola being ſituated near the middle of the convex ſurface. This is what is properly termed the mamma, and it may be called the body of the breaſt, when compared with the other two parts. It increaſes with age, and is very large in women with child, and in thoſe that give ſuck. In old age it decreaſes and becomes flabby, loſing its natural conſiſtence and ſolidity.

The body of the breaſt is partly glandular, and partly made up of fat; or it is a glandular ſubſtance, mixed with portions of the membrana adipoſa, the cellulous pellicles of which ſupport a great many blood-veſſels, lymphatics, and ſerous or lactiferous ducts, together with ſmall glandular moleculæ, which depend on the former; all of them being cloſely ſurrounded by two membranes, continued from the pelliculæ.

The innermoſt of theſe two membranes, which is, in a manner, the baſis of the body of the mamma, is thick and almoſt flat, adhering to the muſculus pectoralis major. The ſecond or external membrane is thinner, forming a particular integument for the body of the breaſt, more or leſs convex, and adhering cloſely to the ſkin.

The corpus adipoſum of the breaſt in particular is a ſpongy cluſter, more or leſs interlarded with fat, or a collection of membranous pelliculæ, which, by the particular diſpoſition of their outſides, form a kind of membrane in ſhape of a bag, in which all the reſt of the corpus adipoſum is contained. The anterior or outer portion of this bag, or that which touches the ſkin, is very thin; but that ſide next the pectoralis major is thick.

The glandular body contains a white maſs, which is merely a collection of membranous ducts, narrow at their origin, broad in the middle, and which contract again as they approach the papillæ, near which they form a kind of circle of communication. They are called ductus lactiferi.

The areola is formed by the ſkin; the inner ſurface of which ſuſtains a great number of ſmall glandular moleculæ, of that kind which Morgagni calls glandulæ ſebacæ. They appear very plainly all over the areola, even on the outſide, where they form little flat eminences, at different diſtances, quite round the circle.

Theſe tubercles are perforated by ſmall holes, through which a kind of ſebaceous or cheeſy matter, more or leſs liquid, may be ſqueezed out. Sometimes this is a ſerous liquor, ſometimes a milky ſerum, and ſometimes pure milk, eſpecially in nurſes; and I have ſeen both ſerous and milky drops come out at the ſame time.

From thence I am inclined to think, that theſe holes communicate with the lactiferous ducts, and that the tubercles are a kind of auxiliary papillæ added to the true ones. The different liquors that may be ſqueezed from the ſame glandular body, give alſo room to think that the holes in them communicate by their extremities with ſeveral other ſmall holes. The tubercle in the center of the areola is termed papilla, or the nipple: it is of different ſizes in different ages and conſtitutions, and in the diffent conditions of females in particular. In women with child, or who give ſuck, it is pretty large, and generally longer and higher than it is thick or broad; and when it happens to be ſhort, it cauſes great uneaſineſs to the child.

The texture of the nipple is ſpongy, elaſtic, and liable to divers changes of conſiſtence. It ſeems to be made up principally of ligamentary faſciculi, the extremities of which form the baſis and apex of the nipple: theſe faſciculi appear to be gently folded or curled, their whole length; and if, by drawing the fibres out, theſe folds be deſtroyed, they return again as ſoon as that action ceaſes.

Between theſe faſciculi lie ſeven or eight particular tubes, at ſmall diſtances from each other, and all in the ſame direction; theſe tubes end at the baſis of the papilla, in the irregular circle of communication of the lactiferous ducts, and at the apex, in the ſame number of almoſt imperceptible holes; and as they are cloſely united to the elaſtic faſciculi, they are folded in the ſame manner with them.

The body of the papilla is covered by a thin cutaneous production, and by the epidermis; its outer ſurface is uneven, being full of ſmall wrinkles;

among

among which, thoſe near the circumference of the nipple ſeem to have a tranſverſe or annular diſpoſition, which, however, is not uniform.

This diſpoſition ſeems to be owing to the elaſtic folds; and from this ſimple ſtructure it is eaſy to explain how infants in ſucking the nipple, and women in drawing the teats of cows, bring out the milk. For the excretory tubes, being wrinkled in the ſame manner as the faſciculi, do by theſe folds, as by ſo many valves, hinder the milk contained in the ducts from flowing out; but when the nipple is elongated, the tubes loſe their folds, and the paſſage becomes ſtraight. Beſides this, when they are drawn with a conſiderable force, the whole body of the breaſt is increaſed in length, and contracted in breadth, and thereby the milk is preſſed into the open tubes; and thus, by barely preſſing the body of the breaſt, the milk may be forced toward the nipple, and even through the tubes.

The arteries and veins diſtributed through the mammæ are ramifications of the arteriæ and venæ mammariæ, of which one kind comes from the ſubclaviæ, and are called mammariæ internæ; the other from the axillares, called mammariæ externæ.

Theſe veſſels communicate with each other, with thoſe near them, and with the vaſa epigaſtrica. The nerves come principally from the coſtales, and by means of theſe communicate with the great nervi ſympathetici.

The uſe of the breaſts, in the nouriſhment of children, is well known to the world: but it is not certainly known what the papillæ and areolæ in men can be deſigned for. Milk has been obſerved in them in children of both ſexes.

MAMMEA, in botany, an ever-green tree, which grows to the height of ſixty or ſeventy feet: the leaves are large and ſtiff; the flower conſiſts of four roundiſh concave petals, which ſpread open; the filaments are ſubulated and numerous, and top'd with roundiſh antheræ; the fruit is a large carnoſe berry, incloſing one, two, or three large oval ſtones.

It grows in great plenty in the Spaniſh Weſt-Indies, where the fruit is generally ſold in their markets. It is of a yellowiſh green colour when ripe, very grateful to the palate, and is eſteemed one of the beſt fruits of that country.

MAMMIFORM, in anatomy, a name given to apophyſes of the bone in the back part of the ſcull, ſo called from their reſembling a breaſt.

MAMMILLARY, MAMMILLARIS, in anatomy, an epithet given to two little protuberances, ſomewhat reſembling the nipples of the breaſt, found under the four ventricles of the brain, and ſuppoſed to be the organs of ſmelling. Theſe are called apophyſes mammillares. There is alſo a muſcle called mammillaris, or maſtoides, ſerving to ſtoop the head.

MAMMOTH's TEETH, in natural hiſtory, certain large foſſile teeth, found in great plenty in Ruſſia, and ſuppoſed to have belonged to elephants.

MAN, *Homo*, in zoology, is juſtly ranked at the head of the animal part of the creation; making a diſtinct genus of that order of quadrupeds, which Linnæus calls anthropomorpha, from their reſemblance to the human form.

The ſame author diſtinguiſhes the race of mankind, according to their different colours, into the Europeans, or white men; the Americans, or copper-coloured men: the Aſiatics, or tawny coloured men: and thoſe of Africa, or blacks.

MANATI, in zoology, an animal called by Linnæus thrichechus. See THRICHECHUS.

MANCHINEEL, hippomane, in botany, a large tree growing naturally in the Weſt-Indian iſlands. It hath a ſmooth browniſh bark; the trunk divides upwards into many branches, which are furniſhed with oblong leaves about three inches long and an inch and a half broad, ending in acute points ſlightly ſerrated on their edges, of a licid green, and ſtanding on ſhort footſtalks. The flowers come out in ſhort ſpikes at the ends of the branches; they are male and female, and both apetalous; the female flower is ſucceeded by a large globoſe fruit (of a yellow colour when ripe) incloſing a rough woody ſhell, with ſeveral cells, which contains in each an oblong ſeed.

The fruit of the manchineel tree is very dangerous to eat, cauſing violent inflammations in the mouth and throat; the wood is much eſteemed in America, for making cabinets, book caſes, &c. being very durable, and taking a fine poliſh; it is alſo ſaid that the worms will not eat it. As the trees abound with milky cauſtic juice, ſo before they are felled, they make fires round their trunks, to burn out their juice, otherwiſe thoſe who fell them would be in danger of loſing their ſight, by the juice flying into their eyes; and wherever this falls on the ſkin, it will raiſe bliſters; if dropt on linen, it immediately turns the part black, and on being waſhed will come in holes. It is alſo dangerous working the wood after it is ſawed out, for if any of the ſaw-duſt happens to get in the workman's eyes, it cauſes inflammations and the loſs of ſight for ſome time; to prevent which, when they are working it they generally cover their faces with fine lawn.

MANDAMUS, in law, a writ that iſſues out of the King's-Bench, ſent to a corporation, commanding them to admit or reſtore a perſon to his office.

MANDARINS, a name given to the magiſtrates and governors of provinces in China, who are choſen out of the moſt learned men, and whoſe government is always at a great diſtance from the place of their birth. Mandarin is alſo a name given by the Chineſe to the learned language of the country; for beſides the language peculiar to every pro-

vince, there is one common to all the learned in the empire, which is in China what Latin is in Europe; this is called the Mandarin tongue, or the language of the court.

MANDATE, in law, a judicial commandment to do ſomething.

MANDATE, in the canon-law, a reſcript of the pope, commanding an ordinary collator to put the perſon therein named in poſſeſſion of the firſt vacant benefice in his collation.

MANDRAKE, *Mandragora*, in botany, a plant, whoſe root is thick, long, and taper, like thoſe of the parſnip: it runs a conſiderable depth in the ground; it is ſometimes ſingle, and at others divided into two or three branches; it is whitiſh within, and of a ruſty aſh-colour without; it hath no ſtalks, the leaves ariſing immediately from the root, ſtanding erect at firſt, but when full grown they ſpread open and lay on the ground; they are more than a foot in length, and four or five inches broad in the middle, growing narrow towards both ends; of a dark green colour and a fetid ſcent; between theſe come out the flowers, upon a ſhort footſtalk; theſe are erect, monopetalous, and campanulated. The fruit is a large globoſe berry, containing two cells, with a fleſhy, convex receptacle; the ſeeds are numerous, and kidney-ſhaped. Mandrake grows wild in Italy, Spain, Portugal, and other warm countries. The roots will remain ſound fifty years or more: but as to the reſemblance to a human form, as many aſſert, it is nothing but an impoſture, owing to perſons that would deceive the public, who form the freſh roots of briony into ſuch ſhapes, and ſhew them for mandrakes. (See the article BRYONIA). Many wonderful things have been ſaid of its virtues by different authors; however, they all agree it is a narcotic, and when taken in too large a doſe will produce dangerous ſymptoms. It is reckoned cooling in external applications, and therefore recommended in inflamations of the eyes.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe, of which there are ſeveral kinds, as the flat mandrels, which have three or more little pegs or points near the verge, and are uſed for turning flat boards on; the pin mandrels are thoſe which have a long wooden ſhank to fit into a large hole made in the work to be turned; hollow mandrels are thoſe hollow of themſelves, and uſed for turning hollow work: ſcrew mandrels for turning ſcrews, &c

MANE, the hair hanging down from a horſe's neck, which ſhould be long, thin, and fine; and if frizzled, ſo much the better.

MANEGE, or MANAGE, the exerciſe of riding the great horſe, or the ground ſet apart for that purpoſe; which is ſometimes covered, for continuing the exerciſe in bad weather; and ſometimes open, in order to give more liberty and freedom both to the horſemen and horſe.

One way or other we may always ſuppoſe a center in the middle of the manege-ground, for regulating the rounds and volts. Sometimes this center is diſtinguiſhed by a pillar fixed in it, to which they tie the horſe when he begins to learn: upon the ſide of the manege other pillars are placed, two by two, in order to teach horſes to raiſe the fore quarters, by tying them with ropes. See PILLAR.

MANES, in the pagan ſyſtem of theology, a general name for the infernal deities, or gods of hell.

The ancients comprehended under manes, not only Pluto, Proſerpine, and Minos, but the ſouls likewiſe of the deceaſed were taken into the number, and eſteemed gods of hell. It was uſual to erect altars and offer libations to the manes of deceaſed friends and relations.

MANGER, in the ſea-language, a ſmall apartment in the fore-part of a ſhip, which is fenced on the after-part by a ſort of bulk head or barrier; the uſe of which is to prevent the water, which ruſhes in at the hawſe-holes, or the holes through which the cable goes, from running aft on the lower decks, which would render them extremely uncomfortable to the men, who eat and ſleep there. As ſoon as the water enters at the hawſe-holes, which is always the caſe when the ſhip pitches deep forward, it is conveyed away again through the ſide into the ſea by ſeveral ſmall pipes or channels, called ſcuppers. See SCUPPERS.

MANGO TREE, in botany, the name of a vaſt tree, forty feet in height, and eighteen in thickneſs, and ſpreads its numerous branches all around at a great diſtance, being always green, and bearing fruit once or twice a year, from ſix or ſeven years old to an hundred. It is propagated by inciſion, or ſowing the ſeed, in Malabar, Goa, Bengal, Pegu, and many other countries in the Eaſt-Indies.

The fruit is of a round oblong figure, flat, ſlightly ſinuated, or hollowed at the ſides, and ſhaped much like a kidney, bigger than a gooſe egg, ſmooth, ſhining, firſt green ſpeckled with white, then inclining to yellow, and at laſt of a gold-colour: it has a yellowiſh and ſucculent pulp, not unlike that of a peach, or rather a plumb, firſt acid, then acido-dulcid, and pleaſant to the taſte. Within the pulp is contained an oblong, compreſſed, and languanous ſtone, thin, yet very hard and tenacious, and including a callous oblong kernel, very like an oblong almond, and of the ſame bigneſs, and of a bitteriſh though not unpleaſant taſte.

There are various ſorts of this fruit, as there are of our apples and pears, which are very different, according to the country where they grow: that ſpecies which is without a ſtone, and is very grateful to the palate, ſeems to us only a variety or a degenerate fruit. The fruit is cut into ſlices, and eaten,

eaten, either without wine, or macerated in wine; it is alſo candied, in order to its preſervation. Sometimes they open it with a knife, and fill up the middle with freſh ginger, garlic, muſtard, and ſalt, with oil or vinegar, that they may eat it with rice, or after the manner of pickled olives.

As to its temperament, this fruit is cold and moiſt, though the Indian phyſicians affirm the contrary. We make uſe of pickled mangoes, which are imported to us, as we do of pickled cucumbers, for ſauce to roaſted meat. The ſtones roaſted are ſaid to cure a looſeneſs, which Garcius found to be true. The wood of the tree, with cinders, is uſed for burning the carcaſes of the Pagans, as being conſecrated to this rite; whence it ſerves alſo for coffins, in which they repoſit their dead; it is but of a ſoft ſubſtance, and of ſhort duration.

The ſtalks ſupply the place of arequa or caunga, in the chewing of betel; the ſame calcined and reduced to powder, take away warts. Of the tender leaves, with the bark of the Avanacoe, that is, the ricinis, the ſeed of the cummin and parpadogam, is made a decoction, which is highly beneficial in the cough, aſthma, and other affections of the thorax. The bark of the tree pulveriſed, and taken in chicken broth, is an excellent diſſolvent of extravaſated and coagulated blood, occaſioned by a fall, in any part of the body. The juice of the bark, with the white of an egg, and a very little opium, taken inwardly, is a preſent remedy againſt the diarrhœa, dyſentery, and teneſmus. Of the gum of the tree, and the flowers of rice, with the addition of a ſmall quantity of opium and pepper, are prepared pills, which alſo cure all ſorts of fluxes of the belly. Of the flour of the dried kernels, the natives have the art of preparing various kinds of food.

MANGANESE, MAGNESIA, in natural hiſtory, a poor kind of iron ore. See IRON.

It is a denſe heavy ſubſtance in its fineſt pieces; being compoſed of a number of broad and thick ſtriæ irregularly laid together, and much reſembling thoſe of native antimony; in theſe maſſes it is ſometimes reddiſh, ſometimes of a dark grey, and ſometimes of a fine pale light grey, approaching to the colour of the fineſt poliſhed iron: but there is a leſs perfect kind, in which the whole maſs ſeems only to conſiſt of a number of irregularly figured pieces, of a brittle and ſomewhat gloſſy ore, blended very looſely together.

Manganeſe is found in great abundance in the German and Swediſh mines, as alſo in France, Italy, and England; but ours is not equal in beauty or goodneſs to the German. It is recommended by authors as an aſtringent, and ordered to be given after calcination in hæmorrhages: but it is very improper for internal uſe. It is of great ſervice, however, to the glaſſmen, in clearing away the greeniſh colour from their white glaſs while in fuſion. See GLASS.

MANICHEES, in church hiſtory, a ſect of Chriſtian heretics in the third century, the followers of Manes, who made his appearance in the reign of the emperor Probus; pretending to be the Comforter, whom our Saviour promiſed to ſend into the world. He taught that there are two principles, or gods, coeternal and independent on each other, the one the author of all evil, and the other, of all good; a doctrine which he borrowed from the Perſian Magi. He held that our ſouls were made by the good principle, and our bodies by the evil one, and that the ſouls of his followers paſſed through the elements to the moon, and from thence to the ſun, where being purified, they then went to God, and became united with his eſſence; but as for the ſouls of other men, they either went to hell, or were united to other bodies. He alledged that Chriſt had his reſidence in the ſun, the Holy Ghoſt in the air, Wiſdom in the moon, and the Father in the abyſs of light. He is alſo charged with denying the reſurrection, and condemning marriage; with teaching that Chriſt was the ſerpent that tempted Eve; with forbidding the uſe of eggs, cheeſe, milk, and wine, as proceeding from the bad principle; with uſing a different kind of baptiſm from that of the church; with teaching that magiſtrates were not to be obeyed, and with condemning the moſt lawful wars.

MANICORDON, or MANICHORD, a muſical inſtrument in the form of a ſpinnet; the ſtrings of which, like thoſe of the clarichord, are covered with little pieces of cloth, to deaden, as well as to ſoften their ſound; whence it is alſo called the dumb ſpinnet. It is much uſed in nunneries, becauſe the nuns may play upon it without diſturbing that ſilence which they are obliged to obſerve in their cells.

MANIFESTO, a public declaration made by a prince in writing, ſhewing his intentions to begin a war, or other enterprize, with the motives that induce him to it, and the reaſons on which he founds his rights and pretenſions.

MANILLE, in commerce, a large braſs ring in the form of a bracelet, either plain or engraven, flat or round.

Manilles are the principal commodities which the Europeans carry to the coaſt of Africa, and exchange with the natives for ſlaves. Theſe people wear them as ornaments on the ſmall of the leg, and on the thick part of the arm above the elbow.

MANIPULUS, in Roman antiquity, a body of infantry, conſiſting of two hundred men, and conſtituting the third part of a cohort. See the article COHORT.

Among phyſicians, the term manipulus ſignifies a handful of herbs or leaves, or ſo much as a man can graſp in his hand at once; which quantity is frequently denoted by the abbreviature, M, or *m*.

MANNA, in the materia medica, a ſweet juice obtained

obtained from certain aſh-trees in the ſouthern parts of Europe, particularly in Calabria and Sicily; exuding from the leaves, branches, or trunk of the tree, and either naturally concreted, or exſiccated and purified by art.

Juices of the ſame nature are collected, in the Eaſtern countries, from other trees and ſhrubs: and ſimilar exudations are ſometimes found on different kinds of trees in Europe, as particularly on the larch in the Briançonois in Dauphiny. How far the manna juices of different vegetables differ from one another, is not well known; but this much is certain, that one and the ſame tree affords mannas very conſiderably different, in their colour, in their taſte, and in their diſpoſition to aſſume a ſolid concrete form: that is, in their purity, or the greater or leſs admixture of oily or reſinous matter.

The beſt ſort of the officinal or Calabrian manna is in oblong pieces or flakes, moderately dry, friable, very light, of a whitiſh or pale yellow colour, and in ſome degree tranſparent. The inferior kinds are moiſt, unctuous, and brown. Both ſorts are ſaid to be ſometimes counterfeited by compoſitions of ſugar, honey, and purgative materials: compoſitions of this kind, in a ſolid or dry form, may be diſtinguiſhed by their weight, compactneſs, and untranſparency, as likewiſe by their taſte, which is ſenſibly different from that of true manna, and with greater certainty by their habitude to menſtrua.

This juice liquefies in a moiſt air, diſſolves readily in water, and by the aſſiſtance of heat, in rectified ſpirit alſo; the impurities only being left by both menſtrua. On inſpiſſating the watery ſolution, the manna is recovered of a much darker colour than at firſt. From the ſaturated ſpirituous ſolution, great part of it ſeparates as the liquor cools, concreting into a flaky maſs, of a ſnowy whiteneſs, and a very grateful ſweetneſs: the liquor remaining after the ſeparation of this pure ſweet part of the manna, leaves, on being inſpiſſated, an unctuous, dark-coloured, diſagreeable matter, in greater or leſs quantity, according as the manna made uſe of was leſs or more pure.

Manna, in doſes of an ounce and upwards, proves a gentle laxative; it operates in general with great mildneſs, ſo as to be ſafely given in inflammatory or acute diſtempers, where the ſtimulating purgatives have no place. It is particularly proper in ſtomachic coughs, or thoſe which have their origin in the ſtomach; the manna, by its ſweetneſs and unctuoſity, contributing to obtund as well as to evacuate the offending humours: in this intention, it is ſometimes made into a linctus or lohoch, with equal quantities of oil of almonds and of ſyrup of violets. See LINCTUS.

In ſome conſtitutions, however, it acts unkindly, eſpecially if given in conſiderable quantity, occaſioning flatulencies, gripes, and diſtenſions of the belly; inconveniencies, which may be generally obviated by a ſmall addition of ſome grateful aromatic.

MANNER, in painting, a habitude that a man acquires in the three principal parts of painting, the management of colours, lights, and ſhadows, which is either good or bad, according as the painter has practiſed more or leſs after the truth, with judgment and ſtudy. But the beſt painter is he who has no manner at all. The good or bad choice he makes is called *goûte*.

MANNERS, in poetry, the inclinations, genius, and humour, which the poet gives to his perſons, and whereby he diſtinguiſhes his characters. See CHARACTER.

MANOMETER, or MANOSCOPE, an inſtrument to ſhew or meaſure the alterations in the rarity or denſity of the air. The manometer differs from the barometer in this, that the latter only ſerves to meaſure the weight of the atmoſphere, or of the column of air over it; but the former the denſity of the air in which it is found, which denſity depends not only on the weight of the atmoſphere, but alſo on the action of heat and cold, &c. Authors, however, generally confound the two together, and Mr. Boyle himſelf gives us a very good manometer of his own contrivance, under the title of a ſtatical barometer. See BAROMETER.

MANOR, an ancient royalty or lordſhip, formerly called a barony, conſiſting of demeſnes, ſervices, and a court-baron; and comprehending in it meſſuages, lands, meadow, paſture, wood, rents, an advowſon, &c. It may contain one or more villages, or hamlets, or only a great part of a village, &c.

A manor is a noble kind of fee, granted in part to tenants for certain ſervices to be performed, and partly reſerved to the uſe of the lord's family, with juriſdiction over the tenants, for their farms or eſtates.

There are capital manors or honours that have other manors under them; and alſo cuſtomary manors granted by copy of court roll, the lords of which have power to hold courts, and grant copies, &c.

MANSION, in law, is the chief dwelling-houſe of a lord within his fee, or the capital meſſuage or manor-houſe.

MANSLAUGHTER, generally termed homicide, is killing a perſon without premeditated malice.

MANTELETS, in the art of war, a kind of moveable parapets, made of planks about three inches thick, nailed over one another, to the height of almoſt ſix feet, generally caſed with tin, and ſet upon little wheels, ſo that in a ſiege, they may be driven before the pioneers, and ſerve as blinds to ſhelter them from the enemy's ſmall ſhot. See plate LXIX. *fig.* 7.

There are other ſorts of mantelets, covered on the

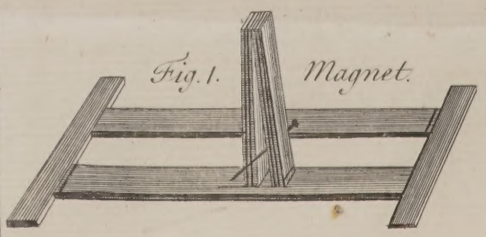

Fig. 1. Magnet.

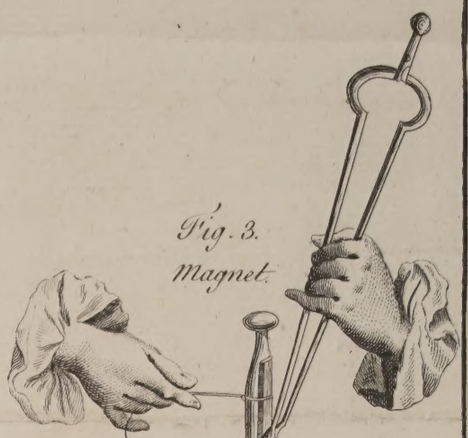

Fig. 3. Magnet.

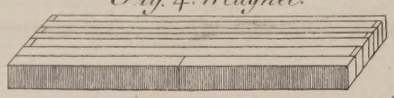

Fig. 4. Magnet.

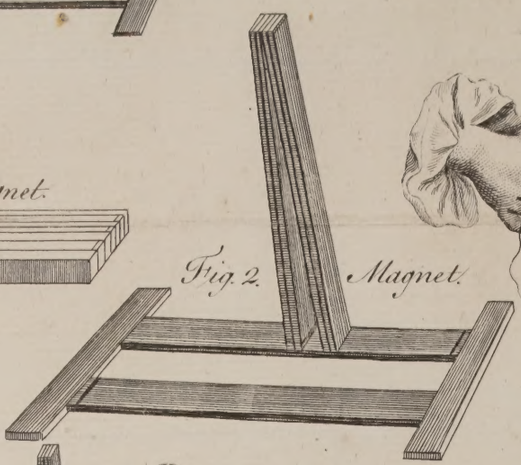

Fig. 2. Magnet.

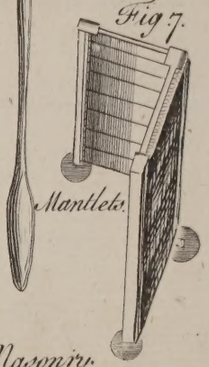

Fig 7.

Mantlets.

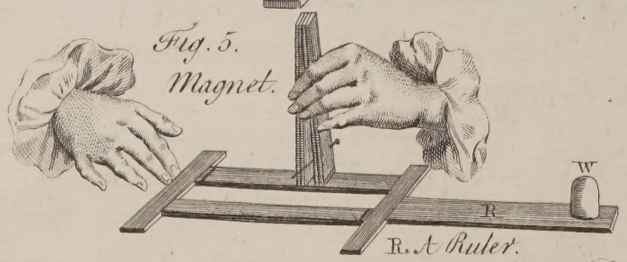

Fig. 5. Magnet.

R. A Ruler.
W. A Weight.

Fig 6. Magnet.

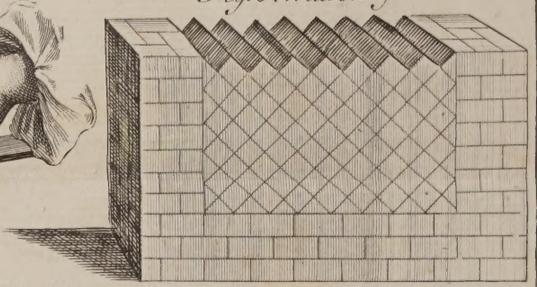

Fig. 8. Masonry.

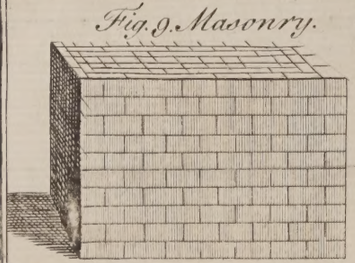

Fig. 9. Masonry.

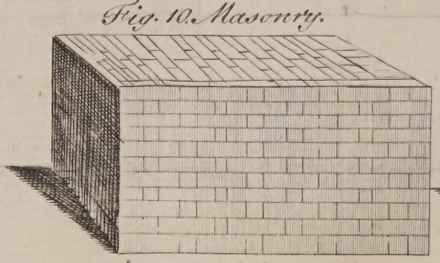

Fig. 10. Masonry.

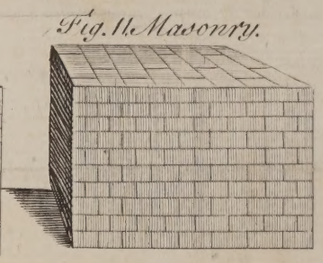

Fig. 11. Masonry.

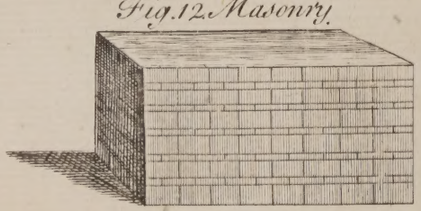

Fig. 12. Masonry.

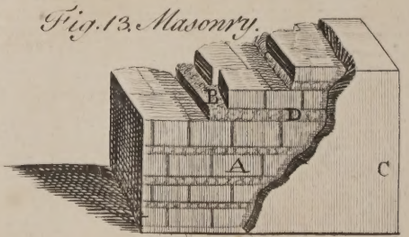

Fig. 13. Masonry.

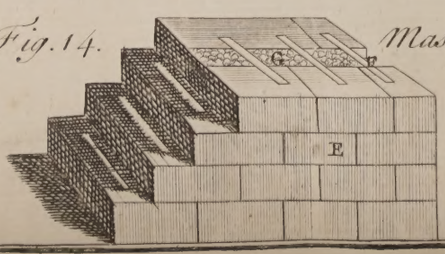

Fig. 14. Masonry.

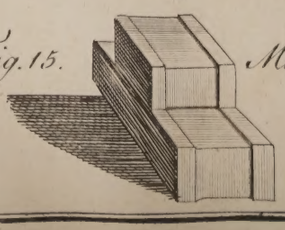

Fig. 15. Masonry.

the top, of which the miners make uſe to approach the walls of a town or caſtle.

MANTLE, or MANTLE-TREE, in architecture, the lower part of the chimney, or that piece of timber which is laid acroſs the jaumbs, and ſuſtains the compartment of the chimney-piece. See CHIMNEY.

MANTLE, or MANTLING, in heraldry, that appearance of folding of cloth, flouriſhing or drapery, that is in any atchievement drawn about the coat of arms. It is ſuppoſed originally to be the repreſentation of a mantle, or military habit, worn by the ancient cavaliers over their armour to preſerve it from ruſt; or, as others hold, a ſhort covering only worn over the helmet, which in aftertimes was lengthened, and made to hang from the helmet below the whole ſhield.

The mantle is always ſaid in blazonry, to be doubled, that is, lined throughout with one of the furs, as ermin, pean, viary, &c.

MANUFACTURER, one who works up a natural product into an artificial commodity.

MANURE, in agriculture and gardening, any thing that is uſed to enrich, fatten, and improve land.

There are various kinds of manure proper for the different kinds of land we meet with: if the land is looſe and ſandy, the mud out of ponds, or ſtrong loam, makes a good manure: marle of the blue kind, and clay of the lighter ſort, ſpread over gravelly or ſandy land, are of vaſt advantage to it, by making it more ſolid and tenacious; cow-dung and hog-dung are alſo excellent for hot lands.

If the land is ſtiff, cold, and clayey, ſheep and deers dung are eſteemed by ſome the beſt manure; likewiſe the dungs of horſes, pigeons, hens, geeſe, &c. are reckoned excellent; alſo ſea and drift ſands, or ſea-coal aſhes, are good manure for theſe ſort of lands: tanners bark, laid in a heap and rotted, is an excellent manure for ſtiff cold land; and one load of it will improve the ground more, and laſt longer, than two loads of any other manure: when this is laid on graſs, it ſhould be done ſoon after Michaelmas, that the winter rains may waſh it into the earth; and where it is uſed for corn land, it ſhould be ſpread on the ſurface before the laſt plowing, that it may be turned down for the fibres of the corn to reach it in the ſpring. Rotten vegetables, of moſt ſorts, alſo greatly enrich land; ſo that, where other manure is ſcarce, theſe may be uſed with great ſucceſs: thus the weeds of ponds, lakes, and ditches, being dragged out juſt as they begin to flower, and laid on heaps to rot, will make an excellent manure; but it is to be obſerved, that in rotting theſe vegetables, it will be proper to mix ſome earth, mud, or any other ſuch like ſubſtance, with them, to prevent their taking fire in their fermentation: it will alſo be neceſſary to cover the heaps with earth, mud, or dung, to detain the ſalts, otherwiſe many of the finer parts will evaporate in fermenting.

The refuſe of kitchen-gardens, when laid on heaps and rotted, will alſo afford good manure for corn land: and alſo fern, mowed down while it is green and tender, and laid on heaps to rot, will make an excellent manure; and by frequently mowing it, this troubleſome plant will be deſtroyed.

The aſhes of all kinds of vegetables are alſo good manure for lands, ſo that where the ground is overrun with buſhes, brambles, &c. if they are grubbed up in ſummer, dried, and conſumed to aſhes, and ſpread over the land, they will greatly improve it.

Rotten wood, and ſaw-duſt when rotted, are a very good manure for ſtrong lands, as are alſo bones, horns, ſhells, woollen-rags, &c. and whatever ſerves too looſen its parts.

But for all ſtubborn clayey ſoils, there is no manure ſo good as the cleanſing of the ſtreets of large cities, the parts of tough land will be more expeditiouſly ſeparated by this, than any other compoſt, and, where it is to be had, it is of the greateſt value both for field or garden land.

MANUSCRIPT, in matters of literature, denotes a written book, in contradiſtinction to a printed one. See BOOK.

MAP, a plane figure, repreſenting the ſurface of the earth, or a part thereof, according to the laws of perſpective; diſtinguiſhing the ſituation of cities, mountains, rivers, &c.

In maps, theſe three things are eſſentially requiſite. 1. That all places have the ſame ſituation and diſtance from the great circles therein, as on the globe, to ſhew their parallels, longitudes, zones, climates, and other celeſtial appearances. 2. That their magnitudes be proportionable to the real magnitudes on the globe. 3. That all places have the ſame ſituation, bearing, and diſtance, as on the earth itſelf.

Maps are either univerſal, which exhibit the whole ſurface of the earth; or particular, which exhibit ſome particular part thereof: each kind is called geographical or land maps, in contradiſtinction to hydrographical or ſea maps, repreſenting the ſeas and ſea coaſts, properly called charts.

As a map is a repreſentation of ſome part of the ſurface of the earth delineated upon a plane, the earth being round, no part of the ſpherical ſurface of it can be accurately exhibited upon a plane, and, therefore, ſome have propoſed the making of globular maps; for this purpoſe, a plate of braſs might be hammered, or, at a leſs expence, a piece of paſteboard might be formed into a ſegment of a ſphere, and covered on its convex ſide with a map projected in the ſame, as the papers of the common globes are: a map made in this method would ſhew every thing in the ſame manner, as it would be ſeen upon a globe of the ſame diameter with the ſphere upon the ſegment of which it was delineated: and, in-

deed,

deed, maps of this ſort would be in effect ſegments of ſuch a globe, but they are not in common uſe.

The ancients deſcribed all the parts of the known earth in one general map; in this view, one of them compares the ſhape of the earth to the leather of a ſling, whoſe length exceeds its breadth: the length of the then known parts of the earth from eaſt to weſt was conſiderably greater than from north to ſouth; for which reaſon, the former of theſe was called the longitude, and the other the latitude.

The modern general maps are ſuch as give us a view of an entire hemiſphere, or half of the globe; and are projected upon the plane of ſome great circle, which terminates the projected hemiſphere, and divides it from the other half of the globe, as the equator, or the meridian, or horizon of ſome place: from this circle the projection is denominated, and ſaid to be equatorial, meridional, or horizontal.

Particular maps are ſuch as exhibit to us leſs than an hemiſphere; of this ſort are the maps of the great parts, into which the earth is divided, as Europe, Aſia, Africa, North-America, South-America; or maps of particular kingdoms, provinces, countries, or of leſſer diſtricts.

The projections of the circles in general maps are of two ſorts, convex and concave: to underſtand which, we may imagine the globe, upon which the circles are delineated, to be of thin glaſs, and that half of it is viewed at a time; now we may be conceived to view this hemiſphere either on the convex or concave ſide, and we may conceive it to be placed at different diſtances from the eye: from which diverſity of our view, there will ariſe different projections, or pictures of it in a map. If the eye be ſuppoſed to be placed in ſome point of the ſurface of the ſphere to view the concave of the oppoſite hemiſphere, it is called the ſtereographic projection.

In this projection, the parts about the middle are a little contracted, ſo as to be too ſmall for the extreme parts, the reaſon whereof will appear from hence (plate LXX. *fig.* 1.) that if a concave ſemicircle, with equal diviſions, be viewed with the eye in the plane of it continued, at the diſtance of a ſemi-diameter from its center, the projection will be a ſtraight line unequally divided, the parts appearing leſs the nearer to the center; conſequently, if two ſemicircles cutting one another at right angles, drawn upon a concave hemiſphere, and marked with equal diviſions, be viewed in the manner now deſcribed, the projection of them will be ſtraight lines unequally divided, as A C and B D (*fig.* 2.) the parts appearing leſs the nearer to the center. The ſtereographic projection is either equatorial, meridional, or horizontal.

The equatorial projection ſuppoſes the eye to be ſituated in one of the poles of the earth, and from thence to view the oppoſite concave hemiſphere, with its circles, projected upon a plane of glaſs paſſing through the equator. Thus the eye is ſuppoſed to be in the north pole, in order to view the ſouthern hemiſphere; and in the ſouth pole to view the northern hemiſphere. Thus *fig.* 3. is a map of the northern hemiſphere upon that projection: here the meridians are all ſtraight lines, and the parallels are complete circles.

The meridional projection ſuppoſes the eye to be in ſome point of the equator, and from thence to view the oppoſite concave hemiſphere, projected upon a glaſs plane paſſing through ſome meridian, which a meridian drawn through the eye cuts at right angles. Thus *fig.* 7. is a map of the earth in two hemiſpheres, projected upon the plane of a meridian paſſing through one of the Canary-iſlands called Ferro. This meridian is made choice of, becauſe, by making the projection thereon, one hemiſphere contains Europe, Aſia, and Africa; and the other North and South America. Here all the meridians are arches of circles, except that drawn through the eye, which is a ſtraight line; and all the parallels are arches of circles, and the equator is a ſtraight line.

M. de la Hire has invented another meridional projection, which comes the neareſt of all to the nature of the globe, becauſe the meridians are placed therein at equal diſtances, the parallels alſo are nearly equidiſtant, and conſequently the ſeveral parts of the earth have their proper proportion of magnitude, diſtance, and ſituation, nearly the ſame as on the globe itſelf.

In the horizontal projection, the eye is ſuppoſed to be in that point of the ſurface of the globe, which is diametrically oppoſite to the place upon the horizon of which the projection is made, and from thence to view the oppoſite concave hemiſphere, with its circles projected upon a glaſs plane, paſſing through that horizon. Thus, if we project any map of this ſort upon the horizon of London, the eye is ſuppoſed to be in the place of the antipodes to London, and from thence to view the concave hemiſphere. There is a great variety in this ſort of projection; for if the place the horizon it is upon, be under the pole, the horizontal projection is the ſame with the equatorial already deſcribed. If the place be under the equator, it is the ſame with the meridional: if the place be in an oblique ſphere, the projection will be different, according to the different latitude of the place; for it will approach nearer to an equatorial or meridional projection, according as the place is ſituated nearer to one of the poles, or to the equator.

Fig. 4. is a map projected upon the horizon of London, whoſe latitude is 51° 32′. The chief advantage of this kind of maps is this, that the place upon the horizon, on which the map is projected, is always in the center of it, and we may ſee the bearing of places from it.

A particular map is a part of a general one, and may be made upon the ſame principles, as by projecting

jecting a large hemiſphere, and taking ſo much of it as the map is deſigned to contain. When we are to delineate a map of a ſmaller part of the earth, if it be near the equator, the meridians and parallels may be repreſented by equidiſtant right-lines. If at ſome diſtance from the equator, the parallels may be equidiſtant ſtraight lines, and the meridians ſtraight lines, a little converging towards the neareſt pole; or the meridians may be ſtraight lines, converging towards the neareſt pole, and the parallels circular.

When we are to make a map of a very ſmall diſtrict, as of a county or hundred, whatever part of the earth it be in, the meridians and parallels may be equidiſtant ſtraight lines, drawn through every minute, &c. of longitude, according as the largeneſs of the map will allow. See PLOTTING and SURVEYING.

If the eye be ſuppoſed to view the hemiſphere at an infinite diſtance, the projection of its circles, whether it be viewed on the convex or concave ſide, is called orthographic. In this projection, the parts about the middle are very well exhibited, but the extreme parts are very much contracted. See *Orthographic* PROJECTION *of the Sphere*.

Fig. 5. is a general map of the northern hemiſphere projected orthographically upon the plane of the equator. Here the meridians are all ſtraight lines, and the parallels are complete circles. *Fig.* 6. is a general map of an hemiſphere, projected orthographically on the plane of the meridian. Here all the meridians are projected into ſemi-ellipſes, except that which is perpendicular to the plane of projection, and which becomes a ſtraight line thereon. This projection has one advantage not to be found in any other general map; namely, that the decreaſe of the parallels from the equator to the poles, appears therein in true proportion.

The great contraction of the extreme parts in the orthographic projection makes it ſo deficient in the ſecond quality required in maps, that it is ſeldom uſed, except when the diſk of the earth, in a ſolar eclipſe, is to be exhibited.

The uſe of maps is obvious from their conſtruction. The degrees of the meridians and parallels ſhew the longitude and latitude of places; their bearings from each other appear from inſpection; and their diſtances may be meaſured by the diviſions on the meridian, equator, &c.

MAPLE, *Acer*, in botany, a genus of trees producing male and hermaphrodite flowers, each having five ovate petals which ſpread over the cup. The ſtamina are eight ſhort filaments, topped with ſimple antheræ, which are crowned with a cruciform pollen. The fruit conſiſts of a number of capſules, which grow together at the baſe, and are compreſſed, roundiſh, and each terminated by a very large membranaceous ala. The ſeeds are ſingle and roundiſh.

The common maple is ſo well known as to require no deſcription. Moſt of the different ſpecies are propagated by ſowing their ſeeds ſoon after they are ripe, which is in autumn, and the ſucceeding year they will be fit to be planted in rows about three feet aſunder and two feet diſtance in the rows, where they may remain three or four years, when they will be large enough to be tranſplanted where they are intended to remain.

The timber of the common maple is far ſuperior to beech for turners uſe, particularly diſhes, cups, trenchers, &c. and when it abounds with knots (as it very often doth) it is highly eſteemed by the joiners for inlaying, &c. and alſo, for the lightneſs of the wood, is often employed by thoſe that make muſical inſtruments; and, for the whiteneſs of it, was formerly in great requeſt for tables, &c.

MARANTA, Indian arrow-root, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube of which is oblong, compreſſed, and crooked, and its limb cut in ſix ſegments; it hath one membranaceous filament, with a linear antheræ faſtened to the border of the filament. The fruit is a roundiſh capſule, obſcurely trigonal, containing a hard, rough, ovate ſeed.

MARBLE, *Marmor*, in natural hiſtory, a genus of foſſils, being bright and beautiful ſtones, compoſed of ſmall ſeparate concretions, moderately hard, not giving fire with ſteel, fermenting with, and ſoluble in acid menſtrua, and calcining in a ſlight fire.

The colours of marbles being a very obvious and ſtriking character, they are arranged according to them, in the following diviſions. 1. Of the white plain marbles there are two ſorts; the Parian marble of the ancients, and ſtatuary marble of the moderns, an extremely bright and elegant marble; and the Carrara marble; a very fine marble, more compact and cloſe than the former, but leſs bright. 2. Of the plain yellowiſh marbles there is only one ſort, which is a hard, pale yellow, and gloſſy marble, found in many parts of Italy. 3. Of the bluiſh and black marbles there are a great many ſpecies, as the Chian marble, Baſaltes, &c. 4. Of the plain green marbles there is only one kind, the Lacedæmonian marble of the ancients. 5. The pale-coloured or whitiſh brown, commonly called Derby-marble. 6. The green marbles with ſhells. 7. The black Coralloide marble, with and without ſhells. 8. Of the white variegated marble there are a great many ſpecies, variegated with purple, brown, red, blue, &c. 9. Of the brown variegated marbles there are likewiſe ſeveral ſorts, ſome with red veins, others with white, black, or brown veins. 10. Of the yellow veined and variegated marbles ſome are veined with purple, and others with blue. 11. Of the black variegated marbles, ſome are veined with white, and others with blue, yellow, red, &c. 12. The green variegated marbles

bles are likewiſe diſtinguiſhed by the colour of their veins. 13. The grey ſpotted marbles are variegated, ſome with black and others with green ſpots. 14. The red variegated marble is the Brocatello of the Italians, with white and gold veins.

Poliſhing of MARBLE is performed by firſt rubbing them well with a free-ſtone, or ſand, till the ſtrokes of the axe are worn off, then with pumice-ſtone, and afterwards with emery.

Colouring of MARBLE.—The colouring of marble is a nice art, and in order to ſucceed in it, the pieces of marble, on which the experiments are tried, muſt be well poliſhed, and clear from the leaſt ſpot or vein. The harder the marble is, the better it will bear the heat neceſſary in the operation; therefore, alabaſter and the common ſoft white marble are very improper to perform theſe operations upon.

Heat is always neceſſary for the opening the pores of the marble, ſo as to render it fit to receive the colours; but the marble muſt never be made red hot, for then, the texture of the marble itſelf is injured, and the colours are burnt, and loſe their beauty. Too ſmall a degree of heat is as bad as too great; for, in this caſe, though the marble receive the colour, it will not be fixed in it, nor ſtrike deep enough. Some colours will ſtrike even cold, but they are never ſo well ſunk in as when a juſt degree of heat is uſed. The proper degree is that which, without making the marble red, will make the liquor boil upon its ſurface. The menſtruums uſed to ſtrike in the colours, muſt be varied according to the nature of the colour to be uſed. A lixivium made with horſe's or dog's urine, with four parts quick-lime, and one part pot-aſhes, is excellent for ſome colours; common ley of wood-aſhes does very well for others: for ſome, ſpirit of wine is beſt; and, finally, for others, oily liquors, or common white-wine.

The colours which have been found to ſucceed beſt with the peculiar menſtruums, are theſe: ſtone-blue diſſolved in ſix times the quantity of ſpirit of wine, or of the urinous lixivium; and that colour which the painters call litmouſe, diſſolved in common ley of wood-aſhes. An extract of ſaffron, and that colour made of buckthorn berries, and called by the painters ſap-green, both ſucceed well diſſolved in urine and quick-lime, and tolerably well in ſpirit of wine. Vermillion, and a fine powder of cochineal, ſucceed alſo very well in the ſame liquors. Dragon's blood ſucceeds very well in ſpirit of wine, as does alſo a tincture of logwood, in the ſame ſpirit. Alkanet root gives a fine colour, but the only menſtruum to be uſed for this is oil of turpentine; for neither ſpirit of wine, nor any lixivium, will do with it. There is another kind of ſanguis draconis called dragon's blood in tears, which, mixed with urine alone, gives a very elegant colour. *Philoſophical Tranſactions.* N°. 268.

Beſides theſe mixtures of colours and menſtruums, there are ſome colours which are to be laid on dry and unmixed. Theſe are dragon's blood, of the pureſt kind, for a red; gamboge for a yellow; green-wax for a green; common brimſtone, pitch, and turpentine, for a brown colour. The marble, for theſe experiments, muſt be made conſiderably hot, and then the colours are to be rubbed on dry in the lump. Some of theſe colours, when once given, remain immutable; others are eaſily changed or deſtroyed. Thus the red colour given by dragon's blood, or by a decoction of logwood, will be wholly taken away by oil of tartar, and the poliſh of the marble not hurt by it.

A fine gold colour is given in the following manner: take crude ſal armoniac, vitriol, and verdigris, of each equal quantities; white vitriol ſucceeds beſt, and all muſt be thoroughly mixed in fine powder.

The ſtaining of marble to all the degrees of red or yellow, by ſolutions of dragon's blood or gamboge, may be done by reducing theſe gums to powder, and grinding them, with the ſpirit of wine, in a glaſs mortar; but, for ſmaller attempts, no method is ſo good as the mixing a little of either of theſe powders with ſpirit of wine, in a ſilver ſpoon, and holding it over burning charcoal. By this means a fine tincture will be extracted, and, with a pencil dipped in this, the fineſt traces may be made on the marble, while cold, which, on the heating it afterwards, either on ſand, or in a baker's oven, will all ſink very deep, and will remain perfectly diſtinct in the ſtone. It is very eaſy to make the ground colour red or yellow by this means, and leave white veins in it. This is to be done by covering the places where the whiteneſs is to remain, with ſome white paint, or even with two or three doubles only of paper, either of which will prevent the colour from penetrating in that part. All the degrees of red are to be given to marble by means of this gum alone; a ſlight tincture of it, without the aſſiſtance of heat to the marble, gives only a pale fleſh colour, but the ſtronger tinctures give it yet deeper; to this the aſſiſtance of heat adds yet greatly; and, finally, the addition of a little pitch to the tincture gives it a tendency to blackneſs, or any degree of deep red that is deſired.

A blue colour may be given alſo to marble by diſſolving turnſol in a lixivium of lime and urine, or in the volatile ſpirit of urine; but this has always a tendency to purple, whether made by the one or the other of theſe ways. A better blue, and uſed in an eaſier manner, is furniſhed by the Canary turnſol, a ſubſtance well known among the dyers: this needs only to be diſſolved in water, and drawn on the place with a pencil; this penetrates very deep into the marble, and the colour may be increaſed by drawing the pencil, wetted afreſh, ſeveral times over the ſame lines. This colour is ſubject to ſpread and diffuſe itſelf irregularly; but it may

may be kept in regular bounds, by circumſcribing its lines with beds of wax, or any other ſuch ſubſtance. It is to be obſerved, that this colour ſhould be laid on cold, and no heat given afterwards to the marble; and one great advantage of this colour is, that it is therefore eaſily added to marble already ſtained with any other colours, and it is a very beautiful tinge, and laſts a long time. *Mem. Acad. Par.* 1732.

Arundel MARBLES, ancient marbles with a chronicle of the city of Athens inſcribed on them, many years before our Saviour's birth; preſented to the univerſity of Oxford by Thomas earl of Arundel, whence the name.

MARBLING, the method of preparing and colouring the marbled paper.

There are ſeveral kinds of marbled marble paper; but the principal difference of them lies in the forms in which the colours are laid on the ground: ſome being diſpoſed in whirles or circumvolutions; ſome in jagged lengths; and others in ſpots of a roundiſh or oval figure. The general manner of managing each kind is, nevertheleſs, the ſame; being the dipping the paper in a ſolution of gum tragacanth, or, as it is commonly called, gum-dragon; over which the colours, previouſly prepared with ox-gall and ſpirit of wine, are firſt ſpread.

The peculiar apparatus neceſſary for this purpoſe, is a trough for containing the gum-tragacanth, and the colours; a comb for diſpoſing them in the figure uſually choſen; and a burning ſtone for poliſhing the paper. The trough may be of any kind of wood; and muſt be ſomewhat larger than the ſheets of paper, for marbling which it is to be employed; but the ſides of it need only riſe about two inches above the bottom; for by making it thus ſhallow, a leſs quantity of the ſolution of the gum will ſerve to fill it. The comb may be alſo of wood, and five inches in length; but ſhould have braſs teeth, which may be about two inches long, and placed at about a quarter of an inch diſtance from one another. The burniſhing ſtone may be of jaſper, or agate; but as thoſe ſtones are very dear, when of ſufficient largeneſs, marble or glaſs may be uſed, provided their ſurface be poliſhed to a great degree of ſmoothneſs.

Theſe implements being thus prepared, a ſolution of gum-tragacanth muſt be made, by putting a ſufficient proportion of the gum, which ſhould be white, and clear from all foulneſſes, into clean water; and letting it remain there a day or two, frequently breaking the lumps and ſtirring it, till the whole ſhall appear diſſolved, and equally mixed with the water. The conſiſtence of the ſolution ſhould be nearly that of ſtrong gum-water, uſed in miniature painting; and if it appear thicker, water muſt be added, or if thinner, more of the gum. When the ſolution is thus brought to a due ſtate, it it muſt be paſſed through a linen cloth, and then being put into the trough, it will be ready to receive the colours.

The colours employed for red are carmine, lake, roſe-pink, and vermillion; but the two laſt are too hard and glaring, unleſs they are mixed with roſe-pink, or lake, to bring them to a ſofter caſt: and with reſpect to the carmine and lake, they are too dear for common purpoſes: — for yellow, Dutch pink and yellow oker may be employed: — for blue, Pruſſian blue and verditer may be uſed: — for green, verdigriſe, a mixture of Dutch pink and Pruſſian blue, or verditer, in different proportions: — for orange, the orange-lake, or a mixture of vermillion, or red lead, with Dutch pink: — for purple, roſe-pink and Pruſſian blue.

Theſe ſeveral colours ſhould be ground with ſpirit of wine till they be of a proper fineneſs; and then, at the time of uſing them, a little fiſh-gall, or in default of it, the gall of a beaſt ſhould be added, by grinding them over again with it. The proper proportion of the gall muſt be found by trying them; for there muſt be juſt ſo much as will ſuffer the ſpots of colour, when ſprinkled on the ſolution of the gum-tragacanth, to join together, without intermixing or running into each other.

When every thing is thus prepared, the ſolution of the gum-tragacanth muſt be poured into the trough; and the colours, being in a ſeparate pot, with a pencil appropriated to each, muſt be ſprinkled on the ſurface of the ſolution, by ſhaking the pencil, charged with its proper colour over it; and this muſt be done with the ſeveral kinds of colour deſired, till the ſurface be wholly covered.

When the marbling is propoſed to be in ſpots of a ſimple form, nothing more is neceſſary; but where the whirles or ſnail-ſhell figures are wanted, they muſt be made by means of a quill; which muſt be put among the ſpots to turn them about, till the effect be produced. The jagged lengths muſt be made by means of the comb above deſcribed, which muſt be paſſed through the colours from one end of the trough to the other; and will give them that appearance; but if they be deſired to be pointed both ways, the comb muſt be again paſſed through the trough in a contrary direction; or if ſome of the whirles or ſnail-ſhell figures be required to be added, they may be yet made by the means before directed.

The paper ſhould be previouſly prepared for receiving the colours, by dipping it over night in water; and laying the ſheets on each other with a weight over them. The whole being thus ready, the paper muſt be held by two corners, and laid in the moſt gentle and even manner on the ſolution covered with the colours; and there ſoftly preſſed with the hand, that it may bear every where on the ſolution. After which it muſt be raiſed and taken off with the ſame care, and then hung to dry acroſs a proper cord, ſubtended near at hand for that purpoſe:

poſe: and in that ſtate it muſt continue, till it be perfectly dry. It then remains only to give the paper a proper poliſh; in order to which it is firſt rubbed with a little ſope; and then muſt be thoroughly ſmoothed by the glaſs poliſhers, ſuch as are uſed for linen, and called the calender glaſſes. After which it ſhould be again rubbed by a burniſher of jaſper or agate; or, in default of them, of glaſs ground to the higheſt poliſh: for on the perfect poliſh of the paper depends in a great meaſure its beauty and value.

Gold or ſilver powders may be uſed, where deſired, along with the colours; and require only the ſame treatment as them, except that they muſt be firſt tempered with gum-water.

Marbling of books or paper is performed thus: diſſolve four ounces of gum-arabic into two quarts of fair water; then provide ſeveral colours mixed with water in pots or ſhells, and with pencils peculiar to each colour, ſprinkle them by way of intermixture upon the gum-water, which muſt be put into a trough, or ſome broad veſſel; then with a ſtick curl them, or draw them out in ſtreaks, to as much variety as may be done. Having done this, hold your book or books cloſe together, and only dip the edges in, on the top of the water and colours, very lightly; which done, take them off, and the plain impreſſion of the colours in mixture will be upon the leaves; doing as well the ends as the front of the book in the like manner.

Marbling a book on the covers is performed by forming clouds with aqua fortis, or ſpirit of vitriol mixed with ink, and afterwards glazing the covers. See the article BOOK-BINDING.

MARCASITES, *Marchaſitæ*, in natural hiſtory, are defined to be compound inflammable metallic bodies, of a hard and ſolid ſubſtance, of an obſcurely and irregularly foliaceous ſtructure, of a bright glittering appearance, naturally conſtituting whole ſtrata, though ſometimes found in detached maſſes; very freely giving fire with ſteel; not fermenting with acid menſtruums; and when put into the fire, yielding a blue ſulphureous flame, and afterwards calcining into a purple powder.

There are only three known ſpecies of this genus: 1. The ſilver-coloured marcaſite, found in vaſt abundance in lead and tin-mines. 2. The gold-coloured marcaſite. 3. The heavy pale-white marcaſite.

Marcaſites were at firſt ſuppoſed to be almoſt all pure gold or ſilver, according to their colour: but experience has ſhewn, that if they contain any metal at all, no method has hitherto been found of working them to advantage. In Germany, indeed, they extract ſulphur and vitriol from the ſilver marcaſite, which two ſubſtances are always contained in it; and beſides theſe, it has uſually a quantity of arſenic. It has been recommended as a ſtyptic, after being calcined; but as the arſenic may not be all carried off by that operation, its uſe as a medicine ſeems extremely dangerous.

MARCGRAVE, or MARGRAVE, a degree of honour in Germany anſwering to our marquis. See the article MARQUIS.

MARCGRAVIA, in botany, a genus of plants whoſe corolla is monopetalous and of a conico-ovate figure; the ſtamina are numerous, and the fruit is a globoſe coriaceous berry, with a number of cells containing a great many ſmall ſeeds wrapped in a ſoft pulp.

MARCH, in chronology, the third month in the year, conſiſting of thirty-one days. See the articles MONTH and YEAR.

MARCIONITES, Chriſtian heretics in the ſecond century, thus denominated from their leader Marcion, who maintained, that their were two principles or Gods, a good and a bad one. Origen affirms, that he held there was a God of the Jews, a God of the Chriſtians, and a God of the Gentiles. It is ſaid that he denied the reſurrection of the body, condemned marriage, and taught that our Saviour, when he deſcended into hell, diſcharged Cain, the Sodomites, and other impious wretches, out of that place of torment. He rejected all the Old Teſtament, and received only part of St. Luke's Goſpel, and ten of St. Paul's Epiſtles, in the New.

MARCOSIANS, a ſect of Chriſtian heretics in the ſecond century, ſo called from their leader Marcus, who repreſented the ſupreme God as conſiſting not of a trinity, but a quaternity, viz. the ineffable, ſilence, the father, and truth. He held two principles, denied the reality of Chriſt's ſufferings, and the reſurrection of the body, and had the ſame fancies concerning the æons as Valentinus. See the articles ÆONS and VALENTINIANS.

The marcoſians, it is ſaid, made pretences to greater perfection than either St. Paul or St. Peter; and being perſuaded that nothing could hinder their ſalvation, freely indulged themſelves in the practice of vice.

MARDIKERS, or TOPASSES, a mixed breed of Dutch, Portugueſe, Indians, and other nations, incorporated with the Dutch at Batavia, in the Eaſt-Indies.

MARE, the female of the horſe-kind. See the article HORSE.

Such mares as are deſigned for breeding, ought to be as free from defects as poſſible, and ſhould, no more than the ſtallions, have either moon-eyes, watery-eyes, or bloodſhot-eyes; they ſhould have no ſplint, ſpavin, or curb, nor any natural imperfection; for the colts will take after them: but choice ſhould be made of the beſt and ableſt, the moſt high ſpirited, beſt coloured, and fineſt ſhaped; and the natural defects that may be in the ſtallion,

ſhould

ſhould be amended in the mare, as well as that which is amiſs in the mare ſhould be amended in the ſtallion.

As for her age, ſhe may be covered when three years old; but the moſt convenient time is after four, when ſhe will nouriſh her colt beſt; and tho' ſhe may breed till ſhe is thirteen, yet ſhe is not fit for it when ſhe is paſt ten, for the colt of an old mare is commonly heavy. Before a mare is covered, ſhe ſhould be in the houſe about ſix weeks, during which time ſhe ſhould be well fed with good hay and oats well ſifted; and in order to render her conception the more certain, near a quart of blood may be taken from each ſide of her neck, about five or ſix days before covering. Another method to bring a mare in ſeaſon and make her retain, is to give her, for the ſpace of eight days before you bring her to the horſe, about two quarts of hempſeed in the morning, and as much at night; and if ſhe refuſes to eat it, to mingle it with a little bran or oats, or elſe to let her faſt for a while: and if the ſtallion alſo eat of it, it will greatly contribute to generation.

Mares go with foal eleven months and as many days as they are years old; and therefore the propereſt time for covering them is in the beginning of June, that ſhe may foal the May following, when there will be plenty of graſs, which will afford the mares a great abundance of milk for nouriſhing their foals: but a mare ſhould never be covered while ſhe is bringing up her foal, becauſe the foal to which ſhe is giving ſuck, as well as that in her belly, will be prejudiced by it, and ſhe herſelf ſooner ſpent. After covering, let her, for three weeks or a month, have the ſame diet as before, and be kept clean in the ſtable till the middle of May, with her feet well pared and thin ſhod: take her in again about the latter end of September, if not before, and keep her to the end of her foaling. If ſhe cannot readily bring forth, hold her noſtrils ſo as to ſtop her taking wind; and if that will not do, diſſolve madder, to the quantity of a walnut, in a pint of ale, and give it her warm. In caſe ſhe cannot void her ſecundine, or after-burden, boil two or three handfuls of fennel in running-water, then put half a pint of that liquor into as much ſack, or, for want thereof, into a pint of ale, with a fourth part of ſallad-oil, mixed together, and pour it luke-warm into her noſtrils, holding them cloſe for ſome time: otherwiſe give her green wheat, or rye, the laſt of which is beſt.

If the mare has but little milk, boil as much as you can get from her, with the leaves of lavender and ſpike, and bathe the udder with it warm, till the knobs and knots are diſſolved. She ſhould now drink only white water (which is bran put into water;) give her alſo ſweet maſhes: and a month after foaling let her have a maſh with ſome brimſtone or ſavin in it.

MARIGOLD, in botany. See CALENDULA.

African MARIGOLD. See TAGETES.

Corn MARIGOLD. See CHRISANTHEMUM.

Fig MARIGOLD. See MESEMBRYANTHEMUM.

French MARIGOLD. See TAGETES.

Marſh MARIGOLD. See CALTHA.

MARJORAM, in botany. See MAJORANA and ORIGANUM.

MARITIME, ſomething relating to, or bounded by the ſea: thus, a maritime province, or country, is one bounded by the ſea; and a maritime kingdom, or ſtate, is one that makes a conſiderable figure, or is very powerful, at ſea.

MARK, in commerce, a certain note which a merchant puts upon his goods, or upon the caſk, hogſhead, &c. that contains them, in order to diſtinguiſh them from others.

St. MARK *the Evangeliſt's Day*, a feſtival of the Chriſtian church, obſerved April 25.

St. MARK'*s Goſpel*, a canonical book of the New Teſtament, being one of the four Goſpels.

St. Mark wrote his Goſpel at Rome, where he accompanied St. Peter, in the year of Chriſt 44. Tertullian and others pretend, that St. Mark was no more than an amanuenſis to St. Peter, who dictated this Goſpel to him; others affirm that he wrote it after St. Peter's death. Nor are the learned leſs divided as to the language this Goſpel was wrote in; ſome affirming it was compoſed in Greek, others in Latin. Several of the ancient heretics received only the Goſpel of St. Mark; others among the Catholics, rejected the twelve laſt verſes of this Goſpel. The Goſpel of St. Mark is properly an abridgment of that of St. Matthew.

MARK, or MARC, alſo denotes a weight uſed in ſeveral ſtates of Europe, and for ſeveral commodities, eſpecially gold and ſilver. In France, the mark is divided into eight ounces, or ſixty-four drams, or one hundred and ninety-two deniers, or penny-weights, or one hundred and ſixty eſterlines, or three hundred mailles, or ſix hundred and forty felins, or four thouſand ſix hundred and eight grains. In Holland, the mark-weight is alſo called troy-weight, and is equal to that of France. When gold and ſilver is ſold by the mark, it is divided into twenty-four caracts. See the article CARACT.

MARK, is alſo uſed among us for a money of account, and in ſome other countries for a coin.

The Engliſh mark is two-thirds of a pound ſterling, or thirteen ſhillings and four-pence; and the Scotch mark is of equal value in Scotch money of account. The mark-lubs, or Lubec-mark, uſed at Hamburg, is alſo a money of account, equal to one-third of the rix-dollar, or to the French livre; each mark is divided into ſixteen ſols-lubs. Mark-lubs is alſo a Daniſh coin equal to ſixteen ſols-lubs. Mark is alſo a copper and ſilver coin in Sweden. See the article EXCHANGE.

MARKET, a public place in a city or town in which

which live cattle, proviſions, or other goods, are ſet to ſale; and alſo a privilege, either by grant or preſcription, by which a town is enabled to keep a market.

MARLE, *Marga*, a kind of dry, ſoft, foſſile earth, uſed for manuring land.

The word is derived from the old Celtic *marga*, mentioned by Pliny, and afterwards called margilla.

The principal ſorts of marle are the white and red. Too much of it thrown on the ground is found to burn it. Marle is burnt like other ſtone for making of lime.

It is a very material circumſtance in the marling of land, to find out how much the land requires of this manure; and, till experience has thoroughly ſhewn this, it is better to err in laying on too little than too much; becauſe the latter is a fault not to be remedied. It is to be obſerved alſo, that marle never makes ſo great an improvement on land the firſt year, as it does afterwards.

Dice MARLE, in huſbandry, a name given by the people of Staffordſhire to a reddiſh marle, that breaks into ſmall ſquare pieces like dice, or elſe into thin flakes, in the manner of lead ore, and looks ſmooth on the ſurface.

MARLINE, amongſt ſeamen, a ſmall cord or line, uſed to faſten the ſtrops of blocks, &c. See BLOCK.

MARLINE-SPIKE, a kind of iron pin, with a large head, and tapering at the other end to a point. It is employed to penetrate the twiſts or ſtrands of rope in the time of ſplicing, &c. which is joining the end of one rope to another. See the article SPLICE.

The marline-ſpike is alſo uſed for many other purpoſes of a ſimilar nature.

MARMALADE, a confection of plums, apricots, quinces, &c. boiled with ſugar to a proper conſiſtence.

MARMOR, marble. See MARBLE.

MARMOTTE, in zoology, the largeſt animal of the mus or rat kind, with a long naked tail and tawney body; it is near as big as a hare, and breeds only on the tops of mountains in Switzerland. Its feet are ſomewhat like thoſe of a bear.

MARONITES, in church-hiſtory, a ſect of Chriſtians near mount Libanus in Syria, who are in communion with the church of Rome, and have their patriarch, archbiſhops, biſhops, &c.

MARQUE, or *Letters of* MARQUE, in military affairs, are letters of repriſal, granting the ſubjects of one prince or ſtate liberty to make repriſals on thoſe of another.

Letters of marque, among us, are extraordinary commiſſions granted by authority, for reparation to merchants, taken by ſtrangers at ſea; and repriſals is only the retaking or taking of one thing for another.

MARQUETRY, or INLAID-WORK, is a curious work compoſed of ſeveral fine pieces of wood, of various colours, faſtened in thin ſlices on a ground, and ſometimes enriched with other matters, as ſilver, braſs, tortoiſe-ſhell, and ivory; with theſe aſſiſtances the art is now capable of imitating any thing; whence it is by ſome called the art of painting in wood.

The ground on which the pieces are to be arranged and glued, is uſually of well-dried oak or deal, and is compoſed of ſeveral pieces glued together, to prevent its warping. The wood to be uſed in marquetry is reduced into leaves of the thickneſs of a line, or the twelfth part of an inch, and is either of its natural colour, or ſtained, or made black to form the ſhades by other methods: this ſome perform by putting it in ſand heated very hot over the fire; others, by ſteeping it in lime-water and ſublimate; and others, in oil of ſulphur. The wood being of the proper colours, the contours of the pieces are formed according to the parts of the deſign they are to repreſent: this is the moſt difficult part of marquetry, and that which requires the moſt patience and attention.

The leaves to be formed, of which there are frequently three, four, or more joined together, are, after they have been glued on the outermoſt part of the deſign, whoſe profile they are to follow, put within the chaps of the vice; then the workman preſſing the treddle, and thus holding faſt the piece, with his ſaw runs over all the out-lines of his deſign. By thus joining or forming three or four pieces together, not only time is ſaved, but alſo the matter is the better enabled to ſuſtain the efforts of the ſaw, which, how fine ſoever it may be, and how ſlightly ſoever it may be conducted by the workman, except this precaution were taken, would be apt to raiſe ſplinters, and ruin the beauty of the work. All the pieces having been thus formed by the ſaw, and marked, in order to their being known again, each is vaneered, or faſtened in its place, on the common ground, with the beſt Engliſh glue; and this being done, the whole is ſet in a preſs to dry, planed over, and poliſhed with the ſkin of the ſea dog, wax, and ſhave-graſs, as in ſimple vaneering, and the fine branches and more delicate parts of the figures are touched up and finiſhed with a graver.

MARQUIS, a title of honour, next in dignity to that of duke, firſt given to thoſe who commanded the marches, that is, the borders and frontiers of countries.

Marquiſſes were not known in England till king Richard II. in the year 1337, created his great favourite, Robert Vere, the earl of Oxford, marquis of Dublin; ſince which time there have been many creations of this ſort, though at preſent there is but one Engliſh and two Scotch marquiſſes. The manner of creating a marquis differs in nothing from that of a duke, except the difference of the titles, and the marquis's being conducted by a marquis and an earl, while a duke is led by a duke and a marquis;

quis; he is alſo girt with a ſword, has a gold verge put into his hand, and his robe or mantle is the ſame as thoſe of a duke, with only this difference, that a duke's mantle has four guards of ermine, and a marquis's only three and a half. The title given him, in the ſtyle of the heralds, is moſt noble and potent prince. His cap is the ſame as a duke's, and the difference between their coronets conſiſts in the duke's being adorned with only flowers or leaves, while the marquis's has flowers and pyramids with pearls on them, intermixed, to ſhew that he is a degree between a duke and an earl.

MARRIAGE, a contract both civil and religious, between a man and a woman, by which they engage to live together in mutual love and friendſhip, for the ends of procreation, &c.

MARROW, *Medulla*, in anatomy, has various ſignifications: the white ſubſtance of the brain, in contradiſtinction from the cortical part, is called the ſpinal marrow; but, properly, marrow denotes that ſoft oleaginous ſubſtance contained in the cavity of the bones.

Every bone in the body of any conſiderable thickneſs, has either a large cavity, or is full of little cells; in both the one and the other is marrow contained in proper veſicles that open into one another.

In the larger bones this fine oil, by the gentle heat of the body, enters ſome narrow paſſages, which lead to certain fine canals excavated in the ſubſtance of the bone; and from theſe other croſs paſſages, not directly oppoſite to the former, carry the marrow ſtill farther into more longitudinal canals placed nearer the ſurface of the bone. All this contrivance is, that the marrow may ſupple the fibres of the bones, and render them leſs apt to break.

By latter obſervations, blood-veſſels have been found in the bones, ſo that they are nouriſhed in the ſame manner as the other parts of the body. Beſides we find that many bones grow, and yet have no marrow in them, as the horns of deer, lobſters claws, &c.

All marrows are mollifying, rarefying, give relief by friction under laſſitudes and incarnate ulcers.

MARRUBIUM, hore-hound, in botany, a genus of plants, whoſe flower is monopetalous and labiated, the upper lip of which is erect, ſemibifid, and acute, and the under lip reflexed and cut into three ſegments, the ſeeds are four and contained in the cup. The common hore-hound, has a woody fibrous roots from which ariſe ſeveral hairy ſquare ſtalks which are furniſhed with hoary roundiſh leaves, wrinkled and crenated on their edges; the flowers proceed in whorles from the joints of the ſtalks in June, and are of a white colour, the whole plant has a ſtrong diſagreeable ſmell, and grows wild in many parts of England: it is aperient and powerfully reſolves viſcid humours, and by ſome is accounted a ſpecific in moiſt aſthma's, and in all diſeaſes of the breaſt and lungs: the doſe in infuſion is from half a handful, to a handful, the dried leaves may be given to a dram or two.

MARS, in aſtronomy, one of the ſuperior planets, moving round the ſun in an orbit between thoſe of the earth and Jupiter. See the article PLANET.

For the diameter of this planet, and its mean diſtance from the ſun, ſee the articles DIAMETER and DISTANCE.

The character of this planet is ♂, the excentricity of its orbit 141, ſuppoſing the diſtance of the earth from the ſun 1000 equal parts; the inclination of its orbit to that of the earth is 1° 51′; the periodical time in which it performs its revolution round the ſun, is 686 days, 23 hours, 27′ 30″; its revolution round its own axis 24 hours 40′; and its parallax, 30″. See the articles CHARACTER, EXCENTRICITY, &c.

In the achronical riſing of this planet, that is, when it is in oppoſition to the ſun, it is found twice as near the earth as the ſun, which is a phænomenon that has greatly diſcredited the Ptolemaic hypotheſis. This planet, as well as the reſt, borrows its light from the ſun and has its increaſe and decreaſe of light like the moon; and it may be ſeen almoſt biſſected when in its quadratures with the ſun, or its perigæon; but is never corniculated or falcated, as the inferior planets.

Dr. Hook, in 1665, obſerved ſeveral ſpots in this planet, which having a motion, he concluded the planet to have a turbinated motion round its center. In 1666, M. Caſſini obſerved ſeveral ſpots in the two hemiſpheres of Mars, which by continuing his different obſervations very diligently, he found to move by little and little from eaſt to weſt, and to return in the ſpace of 24 hours 40′ to their former ſituation. Whence both the motion and period or natural day of that planet were determined. See the article MACULÆ.

Mars always appears with a ruddy troubled light, whence we conclude that it is incompaſſed with a thick cloudy atmoſphere, which by diſturbing the rays of light in their paſſage and re-paſſage through it, occaſion that appearance, Beſides the ruddy colour of Mars, we have another argument of his being incompaſſed with an atmoſphere, and it is this, that when any of the fixed ſtars are ſeen near his body, they appear extremely obſcured and almoſt extinct; and if this be the caſe, a ſpectator in Mars woud ſcarce ever ſee Mercury, unleſs perhaps in the ſun at the time of conjunction, when Mercury paſſes over his diſk, as he ſometimes appears to us in form of a ſpot. An eye in Mars will

ſee Venus at about the ſame diſtance from the ſun as Mercury appears to us, and the earth about the ſame diſtance from the ſun that Venus appears to us; and when the earth is found in conjunction with and very near the ſun, the eye in Mars will ſee the earth horned or falcated, and its attendant, the moon, of the ſame figure, and at its utmoſt diſtance from the earth not above fifteen minutes of a degree: and as this planet's diſtance from the ſun is to the diſtance of the earth and ſun as 1 ½ to 1; therefore a ſpectator in Mars would ſee the ſun's diameter leſs by one third than it appears to us, and conſequently the degree of light and heat which Mars receives from the ſun, is leſs by one third than that received by the earth; this proportion will however, admit of a ſenſible variation, on acccount of the great excentricity of this planet.

Though the period or year of this planet as has been already obſerved, is nearly twice as long as ours, and his natural day, or the time in which the ſun appears above his horizon, ſetting aſide the conſideration of twilight, is almoſt every where equal to his night; yet it appears that in one and the ſame place, on his ſurface, there will be but very little variety of ſeaſons, or ſcarce any difference of ſummer and winter: and the reaſon is that the axis of his diurnal rotation is nearly at right angles with the plane of his orbit. It will be found notwithſtanding, that places ſituated in different latitudes, that is, at different diſtances from his equator, will have very different degrees of heat, on account of the different inclination of the ſun's rays to the horizon, as it is with us when the ſun is in the equinoxes.

From this conſideration Dr. Gregory endeavours to account for the appearance of the faſciæ in Mars, which are certain ſwaths or fillets ſeen in this planet, and poſited parallel to his equator; for as among us, the ſame climate has at different ſeaſons very unequal degrees of heat, but as in Mars it is otherwiſe, the ſame parallel having always a pretty equable degree of heat, it follows that theſe ſpots may probably be formed in Mars, or in his atmoſphere, as ſnow and clouds are in ours, viz. by the conſtant different intentions of heat and cold in the different parallels, and ſo come to be extended in circles or belts parallel to his equator, or the circle of his diurnal motion. And this ſame principle may, perhaps ſolve the phœnomenon of Jupiter's belts, that planet, like Mars, having a perpetual equinox. See the article JUPITER.

MARS, among chemiſts, denotes iron, as being ſuppoſed to be under the influence of that planet. See the article IRON.

Crocus of MARS. See CROCUS MARTIS.

MARINE implies in general the whole navy of a kingdom or ſtate, comprehending all the royal dock-yards, and the officers, artificers, ſeamen, ſoldiers, &c. employed therein, as well as the ſhipping employed by the merchants for military or commercial purpoſes, together with whatever relates to navigation, ſhip-building, ſailors, and marines.

The hiſtory of the marine affairs of any one ſtate is a very comprehenſive ſubject, much more that of all nations. Thoſe who would be informed of the maritime affairs of Great Britain, and the figure it has made at ſea in all ages, may find abundance of curious matter in Selden's *Mare Clauſum*, and from his time to ours, we may trace a ſeries of facts in Lediard's and Burchet's Naval Hiſtory; but above all, in the Lives of the Admirals, by the accurate and judicious Dr. Campbell.

Not only the preſervation of that ſhare of commerce we at preſent poſſeſs, but its future advancement, and even the very being of Britain, as an independent empire, and a free people, depend no leſs on the good condition and the wiſe regulation of our affairs of the marine, than on the ſuperiority of its naval power. The Delphian oracle being conſulted by the Athenians on the formidable armament and innumerable forces of Xerxes, returned for anſwer, "that they muſt ſeek their ſafety in wooden walls." To which we may affirm, that whenever this nation in particular has recourſe to her floating bulwarks for her ſecurity and defence, ſhe will find ſtrength, wealth, and glory, to be the happy and infallible conſequence.

That the legiſlature has ever been attentive to this great and important object will appear from the following account of the laws that have been enacted relating to the affairs of the Britiſh marine.

So early as 5 Rich. II. c. 3. it was enacted, that none of the king's ſubjects ſhould bring in or carry out any merchandize, but in Engliſh ſhips, on pain of forfeiting all the merchandize otherwiſe conveyed, or the value thereof; but 6 Rich. II. ordains, that the above ſtatute ſhall only take place where able ſhips belonging to the king's ſubject are to be found; for where they are not to be had, the merchants are allowed to hire other ſhips. By 4 Hen. VII. c. 10. it was enacted, that no Gaſcoign or Guieune-wines, &c. ſhould be imported into this realm but in Engliſh veſſels: and that none ſhould freight any merchandize in any ſtranger's ſhip, if he could have ſufficient freight in a denizen's ſhip, under the penalty of forfeiting all merchandize not thus ſhipped, to be divided between the king and the ſeizer: but this act, ſo far as it related to the above wines, was repealed by ſtatute 32 Hen. VIII. c. 14. and arate was ordered of what ſhould be paid for the frieght of the ſeveral ſorts of merchandize in ſhips from the port of London to other places, and from thence to London. By 1 Eliz. c. 13. it was enacted, that if the owner of any merchandize ſhould in the time of peace, embark or unload any part thereof, (maſts, pitch, tar and corn, only excepted)

out of, or into any foreign ſhip, he ſhould pay cuſtom as an alien.

By the act of navigation, 12 Car. II. c. 18. it is enacted, that no goods ſhall be imported into, or exported out of, any territories belonging to, or that may hereafter belong to his majeſty, his heirs and ſucceſſors, in Aſia, Africa, or America, in any other ſhips beſides ſuch as belong to the people of England, Ireland, Wales, or the town of Berwick upon Tweed, and whereof the maſter and three-fourths of the mariners are Engliſh, on pain of forfeiting both the ſhip and lading, one third part to the king, another to the governor of the country where ſuch default ſhall be, if ſeized there, otherwiſe that third alſo to the king, and the other third to him that will ſeize or ſue for the ſame. And commanders at ſea, having the king's commiſſion, are to bring in as prize all ſuch ſhips, and on their being condemned, one moiety is to be for the uſe of ſuch commanders and their companies, and the other moiety to the king. No goods of the growth or manufacture of Muſcovy, or of the produce of the Turkiſh empire, ſhall be imported into England, Ireland, &c. in any ſhip or veſſel not Engliſh built, or not belonging to the people of England, Ireland, &c. and navigated as aforeſaid; except veſſels built at the place from whence the goods came, or of ſuch port where they can only be, and uſually are ſhipped, on pain of forfeiting the ſhip and goods; and all wines of the growth of France and Germany, and divers goods and merchandize from Spain, Portugal, Ruſſia, &c. which ſhall be imported into the places aforeſaid, in any other ſhip than what doth belong to England, Ireland, &c. and are navigated as aforeſaid, ſhall be deemed aliens goods, and pay accordingly. And no foreign built veſſel ſhall paſs as a ſhip belonging to England, Ireland, Wales, &c. till the owner makes it appear to the chief officer of the cuſtoms, in the port next to the place of his abode, that he is not an alien, and takes an oath that it was *bona fide* bought of ſuch perſons, expreſſing the ſum given, and the time and place when and where, &c. and that no foreigner has a ſhare in it. Alſo none ſhall load in any bottom, if ſtrangers or owners, part-owners, or maſter, and of which three-fourths of the mariners at leaſt are not Engliſh, any goods whatſoever from one port or creek of England, Ireland, Wales, Guernſey, Jerſey, or the town of Berwick, to another port of the ſame, on pain of forfeiting ſuch goods and veſſel.

The 22 and 23 Car. II. c. 11. ordains, that where any goods ſhall be laden on board only Engliſh ſhip of the burden of two hundred tons, or upwards, and mounted with ſixteen guns or more, if the maſter yields up ſuch ſhip or goods to any Turkiſh veſſel, or any pirate, without fighting, upon proof thereof in the admiralty, he ſhall be incapable of taking charge of any Engliſh veſſel: and maſters of Engliſh ſhips, though not of that burden, nor mounted as aforeſaid, that ſhall yield without fighting to a Turkiſh ſhip or pirate, that has not at leaſt double the number of guns, ſhall be liable to the penalties of this act. If any inferior officers or mariners of a ſhip, ſhall refuſe to fight when commanded, or utter words to diſcourage others, they ſhall loſe all their wages due, and be impriſoned not exceeding ſix months; and mariners laying violent hands on their commanders, to hinder them from fighting in defence of their ſhips, ſhall ſuffer death as felons. When any Engliſh ſhip ſhall have been defended by fight, and brought to her port, in which fighting any of her men have been wounded or ſlain, the judge of the admiralty, or his ſurrogate, &c. where ſhe ſhall arrive, upon the petition of the maſter and ſeamen, may call ſo many as he ſhall be informed are the adventurers and owners, and by adviſing with them, levy upon the reſpective owners ſuch ſums as he himſelf, and the major part of them preſent, ſhall judge reaſonable, not exceeding two per cent of the ſhip and goods; which money ſhall be diſtributed among the maſter, officers, and ſeamen, or the widows and children of the ſlain, according to the direction of the judge, with the approbation of three or more of the adventurers. By 5th and 6th of William and Mary, c. 24. every perſon who ſhall build, or cauſe to be built, any ſhip of three decks, containing 450 tons, and mounted with thirty-two pieces of ordnance, having ammunition, &c. proportionable, ſhall for the firſt three voyages which the ſaid ſhip ſhall make to any foreign parts, receive a tenth of the cuſtoms called the ſubſidy of tonnage and poundage, payable for merchandize exported and imported in ſuch ſhips; but if after the end of the three firſt voyages, ſhips ſo built, ſhall be altered ſo as to become leſs defenſible than they were at firſt, then they ſhall be forfeited and loſt.

By 2 Ann. c. 9. owners of ſhips might navigate during the war with France, with maſters, and only one half of the mariners Engliſh: and by 3 and 4 Ann. c. 13. any ſhips might be navigated by foreign ſeamen; and foreigners ſerving on board any Engliſh ſhip for two years, were to be deemed natural-born ſubjects, &c.

By 4 Geo. I. c. 12. and 11 Geo. I. c. 29. if any officer or mariner belonging to any ſhip or veſſel, ſhall wilfully caſt away, burn, or deſtroy the ſhip to which he belongeth, or in any-wiſe direct or procure the ſame to be done, with intent to prejudice a perſon that ſhall have granted any inſurance thereon, or any merchant who ſhall load goods therein, or any owner of ſuch veſſel, the perſons offending ſhall on conviction be adjudged guilty of felony without benefit of clergy.

The 5th of Geo. II. c. 20. enacts, that no commander of any ſhip outward-bound ſhall receive on board any gun-powder, either as merchandize or ſtores

ſtores for the voyage, except for his majeſty's ſervice, before ſuch ſhip ſhall be at Blackwall, in the river Thames; and all maſters of ſhips coming into the river, ſhall put on ſhore all powder either before the arrival of their ſhips at the ſaid place, or within twenty-four hours after they come to anchor there, upon pain of forfeiting 5l. for every 50 pounds weight of gun-powder on board, and in like proportion for a leſs quantity. And no guns ſhall be kept loaded with ſhot in merchant ſhips between London-bridge and Blackwall, or fired before the riſing, or after the ſetting of the ſun, under the penalty of 5l. and for every gun ſo fired, 10s. And if any pitch, tar, roſin, or other combuſtible matter ſhall be heated or melted by fire in any ſhips, every perſon ſo offending, ſhall, for every offence, forfeit 5l. And ſhips are liable to be ſearched by an elder brother, appointed by the maſter, wardens, and aſſiſtants of the Trinity-houſe at Deptford. In caſe any ſhip ſhall be moored in the mouth or at any other part of St. Saviour's dock, except ſuch ſhips as ſhall be loading or delivering their cargoes, and others, not exceeding two at a time, that ſhall lie at Shipwright-yard, at the north-weſt corner of the ſaid dock, during the time they ſhall be repairing, the maſter of ſuch ſhip ſhall forfeit 20s. for every day ſhe ſhall continue to be laid up and moored.

By 6 Geo. II. c. 29. maſters of ſhips lying in the river Thames who have occaſion for ballaſt, ſhall pay 1s. per ton colliers, other ſhips 1s. 3d. and foreign ſhips 1s. 7d. per ton, to the corporation of the Trinity-houſe at Deptford; who ſhall pay ballaſt-men 9d. a ton, for raiſing and carrying it, &c. and it ſhall be lawful for any maſter of a ſhip to appoint two perſons to go on board any lighter bringing ballaſt to ſuch ſhips, to inſpect the marks thereof; and every ballaſt-man ſhall immediately before the delivery of ballaſt to any ſhip, trim ſuch lighter, ſo as to make it ſwim at equal marks at the ſtem and ſtern, and pump all the water out, &c. and the maſter, wardens, and aſſiſtants of the Trinity-houſe, are to make good to the maſter, the quantity or value of the ballaſt which ſhall be found deficient, or forfeit 50l. one moity to the poor, and the other to the perſon ſuing for it. The 7th of Geo. II. c. 15. ordains, that no owners of ſhips ſhall be liable to any loſs by reaſon of embezzlement by the maſter or mariners, of any goods ſhipped on board, or for any act done by them, without the privity or knowledge of ſuch owners, further than the value of the ſhip, and amount of the freight during the voyage, in which ſuch embezzlement of the maſter or mariners ſhall be committed; and if ſeveral perſons ſhall ſuffer damage by the means aforeſaid, and the value of the ſhip and cargo ſhould not be ſufficient to make compenſation, then the freighters ſhall receive ſatisfaction in average, in proportion to their reſpective loſſes, to be aſcertained on a bill in equity, exhibited for a diſcovery thereof, and of the value of ſuch ſhip and freight. But nothing in this act ſhall diſcharge any remedy, which any perſon may have againſt the maſter and mariners, in reſpect of an embezzlement. See the articles FREIGHT, INSURANCE, &c.

MARINES, or MARINE FORCES, a body of ſoldiers raiſed for the ſea-ſervice, and trained to fight either in a naval engagement, or in an action aſhore.

The great ſervice of this uſeful corps was manifeſted frequently in the courſe of the late war, particularly at the ſiege of Belleiſle, where they acquired a great character, although lately raiſed, and hardly exerciſed in military diſcipline. At ſea they are incorporated with the ſhip's crew, of which they make a part, and many of them learn in a ſhort time to be excellent ſeamen, to which their officers are ordered by the admiralty not to diſcourage them, although no ſea-officer is to order them to go aloft againſt their inclination. In a ſea-fight their ſmall arms are of very great advantage in ſcouring the decks of the enemy; and when they have been long enough at ſea to ſtand firm when the ſhip rocks, they muſt be infinitely preferable to ſeamen if the enemy attempts to board, by fraiſing a battalion with their fixed bayonets to oppoſe him. See the article BOARDING.

The marine forces of Great-Britain in the time of peace are ſtationed in three diviſions; one of which is quartered at Chatham, one at Portſmouth, and another at Plymouth. By a late regulation they are ordered to do duty at the ſeveral dock-yards of thoſe ports, to prevent embezzlement of the king's ſtores, for which a captain's guard mounts every day; which certainly requires great vigilance, as ſo many abuſes of this kind have been committed, that many of the inhabitants, who have been long uſed to an infamous traffic of this kind, expect theſe conveyances at certain periods, as their due, and of courſe reſent this regulation in the higheſt degree as an infringement of their liberty as Engliſhmen.

MARSHAL, in its primary ſignification, means an officer who has the command or care of horſes; but it is now applied to officers who have very different employments, as earl marſhal, knight-marſhal, or marſhal of the king's houſe, &c.

MARSHAL, or MARESCHAL, *of France*, an officer of the greateſt dignity in the French armies. When two or more mareſchals are in the army, the eldeſt commands.

MARSHALLING a coat, in heraldry, is the diſpoſal of ſeveral coats of arms belonging to diſtinct families, in one and the ſame eſcutcheon or ſhield, together with their ornaments, parts, and appurtenances.

MARSHMALLOW, in botany. See the article ALTHÆA.

MARSHY LANDS, thoſe liable to be over flowed

ed by the ſea, or large rivers, for the draining of which, ſee the articles DITCH, DRAIN, &c.

MARSILEA, in botany, a genus of plants of the fern kind; the flowers are male and female, but without cup or corolla; the male flower conſiſts of four ſubulated antheræ, and placed on a hemiſpherical-convex body; the female flower conſiſts of a roundiſh pericarpium with four cells, in each of which are contained ſeveral roundiſh ſeeds. Under this genus is comprehended the ſalvinia of Micheli.

MARSUPIALIS MUSCULUS, in anatomy, a muſcle otherwiſe called the internal obturator. See OBTURATOR.

MARTIAL, among phyſicians, an appellation given to the preparations of iron.

MARTIAL LAW, is the law of war, which entirely depends on the arbitrary power of the prince, or of thoſe to whom he has delegated it: for though the king can make no laws in time of peace without the conſent of parliament, yet in time of war he uſes an abſolute power over the army.

MARTIN, *Martes*, in zoology, a ſpecies of muſtela, of a blackiſh brown colour, and with a pale throat: it is about the ſize of the common cat, but more ſlender. See MUSTELA.

MARTIN is alſo the name of a bird of the hirundo kind, of a black colour, and with the throat white.

MARTINGALE, in the manege, a thong of leather faſtened to one end of the girths under the belly of a horſe, and at the other end to the muſs-roll, to keep him from rearing.

MARTLETS, in heraldry, little birds repreſented without feet, and uſed as a difference or mark of diſtinction for younger brothers, to put them in mind that they are to truſt to the wings of virtue and merit, in order to raiſe themſelves, and not to their feet, they having little land to ſet their feet on.

MARTYNIA, in botany, a genus of plants, whoſe flower is monopetalous and campanulated, gibbous at the baſe, and containing a honey juice: the fruit is an oblong gibbous capſule, dividing into two parts, including a ligneous wrinkled nut, terminating with two incurved horns, and containing four cells, each including an oblong ſeed.

MARTYR, in the Chriſtian ſenſe of the word, is one who lays down his life for the Goſpel, or ſuffers death for the ſake of his religion.

The feſtivals of the martyrs are of very ancient date in the Chriſtian church, and may be carried back at leaſt till the time of Polycarp, who ſuffered martyrdom about the year of Chriſt 168. On theſe days the Chriſtians met at the graves of the martyrs, and offered prayers and thankſgivings to God for the examples they had afforded them; they celebrated the euchariſt, and gave alms to the poor; which, together with a panegyrical oration or ſermon, and reading the acts of the martyrs, were the ſpiritual exerciſes of theſe anniverſaries.

MARTYROLOGY, in the church of Rome, is a catalogue or liſt of martyrs, including the hiſtory of their lives and ſufferings for the ſake of their religion.

MARVEL *of Peru*, in botany. See the article MIRABILIS.

MARUM, Syrian-maſtich, in botany, a low ſhrubby plant, with leaves like thoſe of thyme, but hoary; the flowers are of the labiated kind, and grow in whorled ſpikes; they appear in July and Auguſt.

Marum is propagated by ſlips or cuttings in the ſummer months, and afterwards tranſplanted in a warm dry ſituation; but the greateſt difficulty is to preſerve it from cats, who are ſo fond of it, that they will come a conſiderable diſtance and deſtroy it; but if there are great quantities of it together, they will but little damage it.

Marum is reputed cephalic, and good in all diſorders of the nerves, and alſo for ſtopping hæmorrhages.

MARY MAGDALEN's DAY, a feſtival of the Romiſh church, obſerved on the twenty-ſecond of July.

MASCULINE, or MASCULINE-GENDER, among grammarians, that belonging to the male. See GENDER.

MASON, a perſon employed under the direction of an architect, in the raiſing of a ſtone building.

The chief buſineſs of a maſon is to make the mortar, raiſe the walls from the foundation to the top, with the neceſſary retreats and perpendiculars; to form the vaults, and employ the ſtones as delivered to him. When the ſtones are large, the buſineſs of hewing or cutting them belongs to the ſtone-cutters, though theſe are frequently confounded with maſons: the ornaments of ſculpture are performed by carvers in ſtone or ſculptors. The tools or implements principally uſed by them are the ſquare, level, plumb-line, bevel, compaſs, hammer, chiſſel, mallet, ſaw, trowel, &c. See the articles SQUARE, &c.

MASONRY, in general, a branch of architecture, conſiſting in the art of hewing or ſquaring ſtones, and cutting them level or perpendicular, for the uſes of building; but in a more limited ſenſe, maſonry is the art of aſſembling and joining ſtones together with mortar.

Hence ariſes as many different kinds of maſonry, as there are different forms and manners for laying or joining ſtones. Vitruvius mentions ſeveral kinds of maſonry uſed among the ancients, three of hewed ſtones, viz. that in form of a net, that in binding, and that called the Greek maſonry; and three of unhewed ſtones, viz. that of an equal courſe, that

of an unequal courſe, and that filled up in the middle; and the ſeventh was a compoſition of all the reſt, each in their order.

Net-maſonry, called by Vitruvius reticulatum, from its reſemblance to the meſhes of a net, conſiſts of ſtones ſquared in their courſes, and ſo diſpoſed as that their joints go obliquely; and their diagonals are the one perpendicular, and the other level. This is the moſt agreeable maſonry to the eye, but it is very apt to crack. See plate LXIX. *fig.* 8.

Bound-maſonry, that in which the ſtones were placed one over another, like tiles; the joints of their beds being level, and the mounters perpendicular, ſo that the joint that mounts and ſeparates two ſtones, always falls directly over the middle of the ſtone below. This is leſs beautiful than the net-work; but it is more ſolid and durable. See *fig.* 9.

Greek-maſonry, according to Vitruvius, is that where after we have laid two ſtones, each of which makes a courſe, another is laid at the end, which makes two courſes, and the ſame order is obſerved throughout the building; this may be called double binding, in regard the binding is not only of ſtones of the ſame courſe with one another, but likewiſe of one courſe with another courſe. See *fig.* 10.

Maſonry by equal courſes, called by the ancients iſodomum, differs in nothing from the bound-maſonry, but only in this, that its ſtones are not hewn. See *fig.* 11.

Maſonry by unequal courſes, called pſeudiſodomum, is alſo made of unhewed ſtones, and laid in bound-work; but then they are not of the ſame thickneſs, nor is there any equality obſerved, excepting in the ſeveral courſes; the courſes themſelves being unequal to each other. See *fig.* 12.

Maſonry filled up in the middle, called by the ancients emplection, is likewiſe made of unhewed ſtones, and by courſes; but the ſtones are only ſet in order as to the courſes.

Fig. 13. A, the courſes; B, the parts filled up; C, a coat of plaſter.

Compound maſonry is of Vitruvius's propoſing, ſo called as being formed of all the reſt. In this, the courſes are of hewed ſtones; and the middle being left void, is filled up with mortar and pebbles thrown in together: after this, the ſtones of one courſe are bound to thoſe of another courſe, with cramp-irons faſtened with melted lead.

Fig. 14. E, the ſtones cramped; F, the cramps; G, the middle part filled up.

Fig. 15. repreſents another ſort of compound maſonry, the middle of which is ſtone, and the edges boards.

All the kinds of maſonry now in uſe may be reduced to theſe five, viz. bound maſonry; that of brick-work, where the bodies and projectures of the ſtones incloſe ſquare ſpaces or pannels, &c. ſet with bricks; that de moilon, or ſmall work, where the courſes are equal, well ſquared, and their edges or beds ruſticated; that where the courſes are unequal; and that filled up in the middle with little ſtones and mortar.

MASQUE, or MASK, a cover for the face, with ſuitable apertures for the eyes and mouth.

MASQUES, in architecture, denotes certain groteſque faces, uſed to fill vacant places, as friezes, pannels of doors, keys of arches, &c.

MASQUERADE, an aſſembly of perſons maſked, and dreſſed in peculiar habits, meeting to dance and divert themſelves.

MASS, *Miſſa*, in the church of Rome, the office or prayers uſed at the celebration of the euchariſt; or in other words, conſecrating the bread and wine into the body and blood of Chriſt, and offering them ſo tranſubſtantiated, as an expiatory ſacrifice for the quick and the dead. As the maſs is in general believed to be a repreſentation of the paſſion of our bleſſed Saviour, ſo every action of the prieſt, and every particular part of the ſervice, is ſuppoſed to allude to the particular circumſtancee of his paſſion and death.

MASSALIANS, a ſet of enthuſiaſts who ſprang up about the year 361, in the reign of the emperor Conſtantius, who maintained that men have two ſouls, a celeſtial, and a diabolical, and that the latter is driven out by prayer. They pretended to prophecy, and affirmed that they could ſee the Trinity with their corporeal eyes; and believed that the Holy Ghoſt deſcended viſibly upon them, eſpecially at the time of their ordination, when they trod the devil under foot, and danced upon him.

MASSETER, in anatomy, a muſcle which has its origin in the lower and interior part of the jugum, and its end at the external ſuperficies of the angle of the jaw. The ductus Stenonianus, or ſalival duct of Steno, paſſes over this muſcle.

MASSIVE, among builders, an epithet given to whatever is too heavy and ſolid: thus a maſſive column is one too ſhort and thick for the order whoſe capital it bears; and a maſſive wall is one whoſe openings or lights are too ſmall in proportion.

MASSORA, in matters of literature, a critical work, containing remarks on the verſes, words, letters, and vowel-points of the Hebrew text of the Bible; a work more laborious than uſeful, ſuch poor obſervations being beneath the notice of men of learning.

MAST, in ſhip building, a large ſtrong poſt, or pole, of timber, ſtanding erect in a ſhip to carry ſail, whereby ſhe is enabled to make her progreſs through the ſea.

Among the ancient Grecians every ſhip had ſeveral maſts: we are nevertheleſs informed by Ariſtotle, that at firſt there was only one maſt, which being fixed in the middle of the ſhip, the hole into which the foot of it was inſerted, μεσοδμη; in Latin, *modius*; and in Engliſh, the *ſtep*. The parts of

of the maſt were theſe: πτερνα, or the foot; λινας, or, according to Athenæas, λινος, or τραχηλος, to which the ſail was fixed; καρχησιον, the pulley by which the ropes were turned round; θωρακιον, built in the manner of a turret, for ſoldiers to ſtand upon and caſt their darts; above this was a piece of wood, called ικριον, the extremity of which was termed ηλακατη, on which hung a ribband, called, from its continual motion, επισειων, turning round with the wind; this is termed in Engliſh, the *vane*.

With regard to the moderns, the maſts of their ſhips generally conſiſt of three pieces, joined together lengthwiſe, viz. the lower-maſt, the top-maſt, and the top-gallant-maſt. The top-maſt ſtands at the head of the lower-maſt, and the top-gallant-maſt at the head of the top-maſt in the ſame manner, and either of the two latter can be occaſionally taken down; but the lower-maſt as it is ſettled on the keel of the ſhip, can only be removed by hoiſting it out or cutting it away.

A little below the head of the lower-maſt is fixed the frame of the top, which reſts upon the hounds of the maſt; through this frame the top-maſt is hoiſted, after which, the head of it paſſes through the cap, which is a block of wood with two holes in it, one of which reſts on the head of the lower-maſt, and the other ſerves as above to keep the top-maſt ſteady. When the top-maſt is thus hoiſted up to its utmoſt extent, and kept ſteady above by the cap, and below by the top-frame, a large bar of wood or iron is thruſt through a ſquare hole in the heel of it, cut for that purpoſe; and this bar extending acroſs the middle of the top-frame, the whole weight of the top-maſt reſts upon it; as does the top-gallant-maſt in the ſame manner at the head of the top-maſt.

As every maſt is compoſed of three pieces, it will be alſo neceſſary to inform our readers that all ſhips, properly ſo called, are furniſhed with three maſts, viz. the main-maſt, the fore-maſt, and mizen-maſt. Thoſe which have only two or one maſt, are not called ſhips by ſeamen, but vary their names according to their method of rigging. Of two maſts, there are ſnows, brigs, bilanders, ketches, buſſes, ſchooners, and hermaphrodites, among the Engliſh. Among the Spaniards and Italians, ſettees, barco-longas, feluccas, &c. Thoſe of one maſt are ſloops, tartans, bean-cods, ſhallops, &c.

In the Britiſh navy, maſts are proportioned to the extreme breadth of the ſhip from out to out.

Proportion for the length of maſts, Anno 1745.

			Guns.
1000 : breadth in feet : :	748 :	main-maſt in yards	100
	756 :		90
	753 :		80
	741 :		70 & 60
	740 :		50
	747 :		44
	760 :		24

1000 : main-maſt : : { 895 : 901 : } fore-maſt { 100, 90, 80, & all the reſt.

1000 : main-maſt : : { 870 866 } mizen-maſt { 100, 90, 80, & all the reſt.

1000 : main-maſt : : { 640 613 } bowſprit { 100, 90, 80 & all the reſt.

1000 : main-maſt : : { 600 605 613 } main-top-maſt { 100, 90, 80, 70, 60, 50, 40, 24.

1000 : main-top-maſt : : { 900 : 910 : } fore-top-maſt { 100, 90, 80, all the reſt.

1000 : main-top-maſt : : { 710 717 } mizen-top-maſt { 100, 90, 80, all the reſt.

1000 : main-top-maſt : : { 480 508 } main-top-gallant-maſt { 100, 90, 80, all the reſt.

1000 : fore-top-maſt : : { 480 : 505 : } fore-top-gallant-maſt { 100, 90, 80, all the reſt.

The proportion for maſting ſhips in the merchants ſervice, is generally regulated by the judgment and experience of the commander.

The main and fore-maſt in all ſhips down to 60 guns, one inch diameter to every yard in length.

For 50 and 40 guns, twenty-ſeven twenty-eighths of an inch diameter to one yard in length.

For 24 guns, twelve thirteenths of an inch in diameter to one yard in length.

All top-maſts are nine-tenths of an inch in diameter to one yard in length.

The fore-top-maſt as big as the main-top-maſt.

The top-gallant-maſt, one inch to a yard.

The mizen-maſt, fifteen twenty-ſeconds of an inch to one yard in length.

The mizen-top-maſt, five-ſixths of an inch to one yard in length.

The bowſprit, an inch and a half to one yard.

The jib-boom, ſeven-eights of an inch to a yard. See the articles BOWSPRIT and JIB-BOOM.

MASTER, *Magiſter*, in general, is a title of authority; as the grand maſter of Malta, the maſter of St. Lazarus, &c.

MASTER *of a Ship of War*, an officer who has the charge of navigating the ſhip from port to port, under the direction of the captain; the management and diſpoſition of the ſails, the conducting the ſhip in all extremities of danger, and directing her motions in the time of action, more particularly belongs to him; as alſo to ſuperintend the proviſions, and ſee that none are permitted to come aboard but ſuch as are wholeſome and ſweet: he is alſo to take care that they are ſafely ſtowed by his mates and quarter-maſters; theſe are alſo employed to ſuperintend the navigation when he is off the deck, and to aſſiſt wherever his duty is concerned.

MASTER *of a Merchant-Ship*, the officer who commands aud directs her courſe, manages her lading, and all other affairs.

MASTER *at Arms*, in the marine, an officer, whoſe

whoſe buſineſs it is to confine and plant centries over the priſoners in a ſhip of war; to obſerve that all the lights and fire are put out when the evening gun fires, only ſuch as are allowed by proper authority, or which are under the inſpection of centries: he is alſo to attend the ſide when any boats come aboard, and ſearch carefully that no ſpirituous liquors are brought into the ſhip, but what are permitted by the commanding-officer. He is likewiſe to teach the ſea-men the exerciſe of the ſmall arms, to which they generally have a great averſion; for this purpoſe, in large ſhips, the maſter at arms has ſeveral corporals under him to aſſiſt in his office, and relieve the centries and each other. See the article CORPORAL.

MASTER *Attendant*, in the king's dock-yards, an officer whoſe duty it is to obſerve that all the ſhips, which are laid up, or ſaid to be in ordinary, are properly moored, cleaned, and kept in order; for which purpoſe he is often to viſit and examine them; he alſo attends the muſters in the dock-yard, to obſerve that all the men regiſtered on the books do their duty: he has likewiſe the charge of the moorings, which are fixed in the river or harbour where he reſides, and theſe he is always to keep in good repair, that they may be ready to moor the ſhips of war when neceſſary, which employment he muſt alſo ſee ſecurely performed: he removes the ſhips from one place to another in the harbour, and pilots them into and out of the docks, &c. See the articles DOCK-YARD, ORDINARY, and MOORINGS.

MASTER *Shipwright*. See the article SHIPWRIGHT.

MASTER *of Arts* is the firſt degree taken up in foreign univerſities, and for the moſt part in thoſe of Scotland; but the ſecond in Oxford and Cambridge; candidates not being admitted to it till they have ſtudied ſeven years in the univerſity. See the article DEGREE.

MASTERS *in Chancery*, in ordinary, of which there are twelve, the maſter of the rolls being chief, are uſually choſen out of the barriſters of the common law, and ſit in chancery, or at the rolls, as aſſiſtants to the lord chancellor and maſter of the rolls.

MASTER GUNNER. See GUNNER.

MASTER *of the Horſe*, a great officer of the crown, who orders all matters relating to the king's ſtables, races, breed of horſes; and commands the equerries and all the other officers and tradeſmen employed in the king's ſtables. His coaches, horſes, and attendants are the king's, and bear the king's arms and livery.

MASTER *of the Ordnance*, a great officer who has the chief command of the king's ordnance and artillery.

MASTER *of the Revels*, an officer who orders all things relating to the performance of plays, maſks, balls, &c. at court.

MASTER *of the Rolls*, a patent officer for life, who has the cuſtody of the rolls of parliament and patents which paſs the great ſeal, and of the records of chancery, as alſo commiſſions, deeds recognizances, which being made of rolls of parchment, gave riſe to the name.

MASTERWORT, in botany. See the article IMPERATORIA.

MASTICH, in the materia medica, a concrete reſin, obtained in the iſland Chio from the Lentiſk tree, brought over in ſmall yelloviſh tranſparent grains or tears. From tranſverſe inciſions made in the bark of the tree, about the beginning of Auguſt, the reſin exudes in drops, which running down and concreting on the ground, are thence ſwept up. The tree is raiſed alſo in ſeveral parts of Europe; but no reſin has been obſerved to iſſue from it in theſe climates; nor do all the trees of this ſpecies in the iſland Chio itſelf, afford this commodity. See the article LENTISCUS.

This reſin has a light agreeable ſmell, eſpecially when rubbed or heated: in chewing, it firſt crumbles, ſoon after ſticks together, and becomes ſoft and white like wax, without impreſſing any conſiderable taſte.

Maſtich is recommended, in doſes from half a ſcruple to half a dram, as a mild corroborant and reſtringent, in old coughs, hemoptyſes, diarrœas, weakneſs of the ſtomach, &c. It is given either in ſubſtance, divided by other materials; or diſſolved in ſpirit, and mixed with ſyrups; or diſſolved in water into an emulſion by the intervention of gum-arabic or almonds: the decoctions of it in water, which ſome have directed, have little or nothing of the virtue of the maſtich.

MASTICATION, *Maſticatio*, in medicine, the action of chewing, or of agitating the ſolid parts of our food between the teeth, by means of the motion of the jaws, the tongue, and the lips, whereby it is broken into ſmall pieces, impregnated with ſaliva, and ſo fitted for deglutation, and a more eaſy digeſtion.

MASTICATORIES, in medicine, ſuch remedies as are taken in at the mouth; and chewed in order to promote the evacuation of the ſalival humour, as tobacco, ginger, pepper, ſage, roſemary, thyme, maſtich, &c.

MASTIGADOUR, MASTICADOUR, or SLABBERING BIT, in the manege, a ſnaffle of iron, all ſmooth, and of a piece, guarded with paternoſters, and compoſed of the halfs of great rings, made into demi-ovals, of unequal bigneſs; the leſſer being incloſed within the greater, which ought to be about half a foot high. See the article BIT.

MASTOIDES, in anatomy, the ſame with mammillaris; being applied to ſuch proceſſes in the body as

as have the appearance of breaſts or dugs, ariſing in a broad baſis, and terminating in an obtuſe top. Maſtoides is ſometimes applied to the muſcle which ſtoops the head, proceeding from the neck-bone and breaſt-bone, and terminating in the proceſs of the mammiformis.

MAT, among ſailors, a ſort of web or texture, formed of a variety of foxes, each of which conſiſts of a certain number of rope yarns twiſted together; the foxes are conſequently larger or ſmaller, in proportion to the ſize of the mat required.

Mats are uſed to faſten on the outſides of the ſhrouds, and backſtays, to prevent them from being chafed or fretted by the motion of other ropes which bear againſt them; alſo to laſh on ſeveral block-ſtrops, &c. for the ſame purpoſe; the largeſt ſort of them are called panches. See the article PANCH.

MATCH, a kind of rope ſlighly twiſted, and prepared to retain fire for the uſes of the artillery, mines, fireworks, &c.

It is made of hempen tow, ſpun on the wheel like cord, but very ſlack; and is compoſed of three twiſts, which are afterwards again covered with tow, ſo that the twiſts do not appear: laſtly, it is boiled in the lees of old wines. This, when once lighted at the end, burns on gradually and regularly, without ever going out, till the whole be conſumed: the hardeſt and drieſt match is generally the beſt.

MATCHING, in the wine-trade, the preparing veſſels to preſerve wines and other liquors, without their growing ſour or vapid. The method of doing it, as directed by Dr. Shaw, is as follows: melt brimſtone in an iron ladle, and when thoroughly melted, dip into it ſlips of coarſe linen cloth; take theſe out, and let them cool: this the wine-coopers call a match; take one of theſe matches, ſet one end of it on fire, and put it into the bung-hole of a caſk; ſtop it looſely, and thus ſuffer the match to burn nearly out: then drive in the bung tight, and ſet the caſk aſide for an hour or two. At the end of this time examine the caſk, and you will find that the ſulphur has communicated a violent pungent and ſuffocating ſcent to the caſk, with a conſiderable degree of acidity, which is the gas and acid ſpirit of ſulphur. The caſk may after this be filled with a ſmall wine, which has ſcarce done its fermentation, and bunging it down tight, it will be kept good and will ſoon clarify: this is a common and very uſeful method, for many poor wines could ſcarce be kept potable even a few months without it.

MATE *of a Ship of War*, an officer under the maſter, whoſe duty it is to obſerve the navigation of the ſhip, and to keep the log ſtrictly marked; to trim the ſails in the fore-part of the ſhip, and to ſuperintend all affairs relating to the cables, moorings, and riding of the ſhip; to command the boats in which proviſions and water are brought to the ſhip, and aſſiſt in ſtowing them after they arrive aboard. See the articles LOG, MASTER, and TRIM.

MATE *of a Merchant Ship*, the officer who commands the ſhip in abſence of the commander, and ſhares the duty with him.

The number of mates both in ſhips of war and merchantmen, is in proportion to the ſize of a ſhip: a firſt rate man of war has ſix mates, and an Eaſt-India-man the ſame number.

MATERIA SUBTILIS, denotes a fine ſubtile matter which the Carteſians ſuppoſe to pervade and penetrate freely the pores of all bodies, to fill up all their pores ſo as not to leave the leaſt vacuity or interſtice between them; they had recourſe to this machine to ſupport the doctrine of an abſolute plenum, and to make it conſiſtent with the phænomenon of motion, &c. See the article CARTESIAN PHILOSOPHY.

MATERIA CHEMICA, a term uſed by authors to expreſs ſuch bodies as are the peculiar objects of chemical experiments.

MATERIA MEDICA comprehends all the ſubſtances either uſed in medicine in their natural ſtate, or which afford preparations that are ſo; theſe belong partly to the animal, partly to the vegetable, and partly to the foſſile kingdom.

MATHEMATICS, that ſcience which conſiders magnitudes either as they are computable or meaſurable; that part which relates to number only, is called arithmetic; and that which relates to meaſure in general, whether length, breadth, depth, motion, force, &c. is called geometry.

The word is Greek, μαθηματικη, ſignifying the ſame thing, which is derived from μαθητης, a diſciple, and that from μανθανω, to teach.

The firſt who cultivated mathematics after the flood were the Aſſyrians and Chaldeans, from whom, ſays Joſephus, they were carried by Abraham to the Egyptians, and among theſe Ariſtotle fixes the firſt riſe of mathematics. From Egypt, 584 years before Chriſt, they paſſed into Greece through the hands of Thales; after him came Pythagoras, who paid a particular regard to arithmetic, fetching the greateſt part of his philoſophy from numbers; he firſt, according to Laertius, abſtracted geometry from matter; and to him we owe the doctrine of incommenſurable magnitude, the five regular bodies, beſides the principles of muſic and aſtronomy. To him ſucceeded Anaxagoras, Oenopides, Briſo, Antipho, and Hippocrates of Scio, who all applied to the quadrature of the circle, duplicature of the cube, but the laſt with moſt ſucceſs, and Proclus mentions him as the firſt compiler of mathematical elements.

Democritus excelled in mathematics as well as phyſics. The next is Plato, who not only improved geometry, but introduced it into phyſics. Out of his ſchool proceeded a croud of mathematicians,

ticians, among whom was Leodamus, who improved the analyſis firſt invented by Plato; Theætetus, who wrote on elements, and Archytas, who firſt applied mathematics to uſe in life. Theſe were ſucceeded by Neocles and Theon. Eudoxus excelled in arithmetic and geometry, and was the firſt founder of a ſyſtem of aſtronomy. Menechonus improved the elements.

Ariſtotle's works are ſtored with mathematics; out of whoſe ſchool came Eudemus and Theophraſtus; the firſt wrote of numbers, geometry, and inviſible lines; the later a mathematical hiſtory. To Ariſteus, Iſidorus, and Hypſicles, we owe the book of ſolids, which, with the other books of elements, were improved and methodiſed by Euclid, who died 284 years before Chriſt.

An hundred years after Euclid, came Eratoſthenes and Archimedes; cotemporary with the latter was Conon. Soon after came Apollonius Pergæus, whoſe conics are ſtill extrant. Hipparchus and Menelaus wrote on the ſubtenſes in a circle, the latter on ſpherical triangles. Theodoſius's three books of ſpherics are ſtill extant.

In the year 70, Ptolomy of Alexandria was born; he was ſucceeded by Plutarch the philoſopher; after him was Eutocius, who commented on Archimedes, and occaſionally mentions ſeveral inventions on the duplicature of the cube. To Cteſebes of Alexandria we owe our pumps; and Geminus came ſoon after, whom Proclus prefers to Euclid himſelf.

Diophantus of Alexandria was a great maſter of numbers, and firſt inventor of algebra. Nicomachus is celebrated for his arithmetical, geometrical, and muſical works; Serenus, for his books on the ſection of the cylinder; Proclus, for his comments on Euclid: and Theon is, by ſome, thought to be the author of Euclid's Elements. Pappus of Alexandria flouriſhed in the year 400, and his books of Mathematical Collections are ſtill extant.

Dr. Barrow gives a moſt elegant deſcription of the excellence and uſefulneſs of mathematical knowledge, in his Inaugural Oration, upon being appointed profeſſor of mathematics at Cambridge.

The mathematics, he obſerves, effectually exerciſe, not vainly delude, nor vexatiouſly torment ſtudious minds with obſcure ſubtilties; but plainly demonſtrate every thing within their reach, draw certain concluſions, inſtruct by profitable rules, and unfold pleaſant queſtions. Theſe diſciplines likewiſe enure and corroborate the mind to a conſtant diligence in ſtudy; they wholly deliver us from a credulous ſimplicity, moſt ſtrongly fortify us againſt the variety of ſcepticiſm, effectually reſtrain us from a raſh preſumption, moſt eaſily incline us to a due aſſent, perfectly ſubject us to the government of right reaſon. While the mind is abſtracted and elevated from ſenſible matter, diſtinctly views pure forms, conceives the beauty of ideas, and inveſtigates the harmony of proportions; the manners themſelves are ſenſibly corrected and improved, the affections compoſed and rectified, the fancy calmed and ſettled, and the underſtanding raiſed and excited to more divine contemplations.

Mathematics are commonly diſtinguiſhed into pure and ſpeculative, which conſider quantity abſtractedly; and mixed, which treat of magnitude as ſubſiſting in material bodies, and conſequently are interwoven every where with phyſical conſiderations.

Mixed mathematics are very comprehenſive; ſince to them may be referred aſtronomy, optics, geography, hydrography, hydroſtatics, mechanics, fortification, navigation, &c. See the articles ASTRONOMY, OPTICS, &c.

Pure mathematics have one peculiar advantage, that they occaſion no diſputes among wrangling diſputants, as in other branches of knowledge; and the reaſon is, becauſe the definitions of the terms are premiſed, and every body that reads a propoſition has the ſame idea of every part of it. Hence, it is eaſy to put an end to all mathematical controverſies, by ſhewing either that our adverſary has not ſtuck to his definitions, or has not laid down true premiſes, or elſe, that he has drawn falſe concluſions from true principles, and in caſe we are able to do neither of theſe, we muſt acknowledge the truth of what he has proved.

MATRICARIA, feverfew, in botany. See FEVERFEW.

MATRICULA, a regiſter kept of the admiſſion of officers and perſons entered into any body or ſociety, of which a liſt is made.

MATRIX, *Uterus*, the womb, in anatomy, that part of the female of any kind, where the fœtus is conceived and nouriſhed till the time of its delivery. See UTERUS.

MATRIX alſo denotes a place proper for the generation of vegetables, minerals, metals.

MATRIX, in letter-foundery. See the article FOUNDERY.

MATRONALIA, a feſtival of the ancient Roman matrons, from whom it had its name. It was celebrated on the calends of March, in honour of the god Mars; and was to the Roman ladies what the feſtival of the Saturnalia was to their huſbands; for at this time they ſerved their women-ſlaves at table, and received preſents from their huſbands.

MATROSSES are ſoldiers in the train of artillery, who are next to the gunners, and aſſiſt them in loading, firing, and ſponging the great guns. They carry firelocks, and march along with the ſtore waggons, both as a guard, and to give their aſſiſtance in caſe a waggon ſhould break down.

MATTER, *Materia*, in phyſiology, whatever is extended and capable of making reſiſtance: hence, becauſe all bodies, whether ſolid or fluid, are extended and do reſiſt, we conclude that they are material,

teral, or made np of matter. The Carteſians, it is true, make matter to conſiſt in extenſion alone; but extenſion without reſiſtance, is nothing but mere ſpace. That matter is one and the ſame thing in all bodies, and that all the variety we obſerve ariſes from the various forms and ſhapes it puts on, ſeems ſeems very probable, and may be concluded from a general obſervation of the procedure of nature in the general formation and deſtruction of bodies. Thus, for inſtance, water, rarefied by heat, becomes vapour; great collections of vapours form clouds; theſe condenſed deſcend in the form of hail or rain; part of this collected on the earth conſtitutes rivers, another part mixing with the earth enters into the roots of plants, and ſupplies matter to, and expands itſelf into various ſpecies of vegetables. In each vegetable it apears in one ſhape in the root, another in the ſtalk, another in the flowers, another in the ſeeds, &c. From hence various bodies proceed; from the oak, houſes, ſhips, &c. from hemp and flax we have thread; from thence our various kinds of linen; from thence garments; theſe degenerate into rags, which receive from the mill the various forms of paper; hence our books; which by fire are converted partly into water, partly into oil, another part into air, a fourth part into ſalt, and a fifth into earth; which are called the elements of bodies; and which, mixed with common earth, are again reſuſcitated in various forms of bodies.

Sir Iſaac Newton thinks it highly probable, that God in the beginning formed matter into ſolid, maſſy, impenetrable, moveable particles, or atoms, of ſuch ſizes and figures, and with ſuch other properties, and in ſuch proportion to ſpace, as moſt conduced to the end for which he formed them; and that theſe primitive particles being ſolids, are incomparably harder than any porous bodies compounded of them, even ſo hard as never to wear or break in pieces; no ordinary power being able to divide what God himſelf made one in the firſt creation. While theſe particles continue entire, they may compoſe bodies of one and the ſame nature and texture in all ages; but ſhould they wear away, or break in pieces, the nature of things depending on them may be changed. Water and earth, compoſed of old worn particles and fragments of particles, would not be of the ſame nature and texture now, with water and earth compoſed of intire particles in the beginning; and therefore, that nature may be laſting, the changes of corporeal things are to be placed only in the various ſeparations and new aſſociations of motions of theſe permanent particles, compound bodies being apt to break, not in the midſt of ſolid particles, but where theſe particles are laid together, and only touch in a few points. See the article ATOM.

MATTER *in Deed*, in law, ſignifies a particular matter of fact to be proved by ſome deed, and is frequently mentioned with matter of record; as where a man, during his abſence abroad in the king's ſervice, is ſued to an exigent; in which caſe, if ſuch perſon would take advantage of this matter in deed, he muſt alledge it before a ſcire facias for execution is awarded againſt him, otherwiſe he can have no relief but from matter of record; that is, ſome error in the proceedings appearing upon the face of the record.

MATTHEW, or *Goſpel of St.* MATTHEW, a canonical book of the New-Teſtament.

St. Matthew wrote his Goſpel in Judea, at the requeſt of thoſe he had converted, and it is thought he began it in the year 41, eight years after Chriſt's reſurrection. It was written, according to the teſtimony of all the ancients, in the Hebrew or Syriac language, which was then common in Judea; but the Greek verſion of it, which now paſſes for the original, is as old as the apoſtolical times. St. Matthew's view in writing his Goſpel, was chiefly to ſhew the royal deſcent of Jeſus Chriſt, and to repreſent his life and converſation among men. No one of the Apoſtles enters ſo far into the particulars of the actions of Jeſus Chriſt, or has given ſo many rules for the conduct of life. If we compare him with the other three evangeliſts, we may obſerve a remarkable difference in the order and ſucceſſion of our Saviour's actions, from chap. iv. to chap. xiv. 13. Some have imputed this variation of St. Matthew to mere chance; and others, to choice and deſign: however, it can be no prejudice to the truth of the facts, which are the eſſential part of the Goſpel; and as to the order of time, the ſacred authors were not always ſolicitous about it.

St. MATTHEW *the Evangeliſt's Day*, a feſtival of the Chriſtian church, obſerved on September the twenty-firſt.

St. MATTHIAS's *Day*, a feſtival of the Chriſtian church, obſerved on the twenty-fourth of February.

MATTINS, the firſt canonical hour, or the firſt part of the daily ſervice in the Romiſh church.

MATURATION, in ſurgery, the ſame with ſuppuration. See SUPPURATION.

MAUNCH, in heraldry, the figure of an ancient coat ſleeve, borne in many gentlemen's eſcutcheons.

MAUNDY-THURSDAY, is the Thurſday in Paſſion-week, which was called Maunday or Mandate Thurſday, from the command which our Saviour gave his Apoſtles to commemorate him in the Lord's Supper, which he this day inſtituted; or from the new commandment which he gave them to love another, after he had waſhed their feet as a token of his love to them.

Our Saviour's humility in waſhing his diſciples feet, is commemorated on this day by moſt Chriſtian kings, who waſh the feet of a certain number of poor people, not indeed with their own royal hands

hands, but by the hands of their lord almoner, or ſome other deputy.

MAUROCENIA, in botany, a genus of plants, whoſe flower conſiſts of five oval petals, which ſpread open; it hath five ſubulated filaments, topped with obtuſe antheræ: the fruit is an oval berry with one or two cells, each containing a ſingle oval ſeed.

MAUSOLEUM, a magnificent tomb, or funeral monument. The word is derived from Mauſolus, king of Caria, to whom Artimiſia, his widow, erected a moſt ſtately monument, eſteemed one of the wonders of the world, and called it, from his name Mauſoleum.

MAXILLA, the jaws, or thoſe parts of an animal in which the teeth are ſet.

The jaws are ſhorter in the human frame than in that of any other animal, in proportion to the ſize of the body; and this is a circumſtance that adds greatly to the beauty of the face. The upper jaw is compoſed of thirteen bones, twelve of which are in pairs: theſe are, 1, the lachrymal; 2, the naſal; 3, the jugal; 4, the maxillar; 5, the ſpongioſum inferius; 6, the palatine; the thirteenth is an odd bone, and is called the vomer. Theſe ſeveral bones of the upper maxilla are united to one another by a kind of juncture, which appears equal and even, and is called by anatomiſts *junctura per harmonium*.

The maxilla inferior, or lower jaw, is that moveable bone of the head which contains the lower ſeries of teeth; this is compoſed of two bones which unite in the middle of the chin, by the intervention of a cartillage, which hardens as the child grows, and at length becoming bony, joins the two bones into a continued one, reſembling the Greek υ. It conſiſts of two tables, between which there is a ſpongy ſubſtance, which in children is medullary. The fore-part is ſhallow, and juſt ſufficient to contain the ſockets of ſixteen teeth. It has two proceſſes, the coronoide and condyloides; four foramina or holes for the paſſage of blood-veſſels and nerves, and ſix pair of muſcles, of which two are depreſſors and four elevators; the depreſſors are called the platyſma myoides, and the biventer; and the four pair of elevators are, the crotaphites, the maſſeters, and the internal and external pterygoidæi, which ſee, under their ſeveral names. There is alſo the maxillary gland, ſituated on the inſide under the lower jaw-bone. See the article GLAND.

MAXIMUM, in mathematics, denotes the greateſt quantity attainable in any given caſe.

If a quantity conceived to be generated by motion, increaſes, or decreaſes, till it arrives at a certain magnitude or poſition, and then, on the contrary, grows leſſer or greater, and it be required to determine the ſaid magnitude or poſition, the queſtion is called a problem de maximis et minimis.

The rule therefore to determine any flowing quantity in any equation propoſed, to an extreme value, is, having put the equation into fluxions, let the fluxion of that quantity (whoſe extreme value is ſought) be ſuppoſed equal to nothing: by which means all thoſe members of the equation in which it is found, will vaniſh, and the remaining ones will give the determination of the maximum or minimum required.

Problem I. To divide a given right line into two ſuch parts, that their product, or rectangle, may be the greateſt poſſible. This is the caſe, when the line is biſſected, or divided into equal parts.

In any mechanical engine, the proportion of the power to the weight, when they ballance each other, is found by ſuppoſing the engine to move, and reducing their velocities to the reſpective directions in which they act; for the inverſe ratio of theſe velocities is that of the power to the weight according to the general principle of mechanics. But it is of uſe to determine likewiſe the proportion they ought to bear to each other, that when the power prevails, and the engine is in motion, it may produce the greateſt effect in a given time. When the power prevails, the weight moves at firſt with an accelerated motion; and when the velocity of the power is invariable, its action upon the weight decreaſes, while the velocity of the weight increaſes. Thus the action of a ſtream of water or air upon a wheel, is to be eſtimated from the exceſs of the velocity of the fluid above the velocity of the part of the engine which it ſtrikes, or from their relative velocity only. The motion of the engine ceaſes to be accelerated when this relative velocity is ſo far diminiſhed, that the action of the power becomes equal to the reſiſtance of the engine ariſing from the gravity of the matter that is elevated by it, and from friction; for when theſe ballance each other, the engine proceeds with the uniform motion it has acquired.

Prob. II. Let a denote the velocity of the ſtream, u the velocity of the part of the engine which it ſtrikes when the motion of the machine is uniform, and $a-u$ will repreſent their relative velocity. Let A repreſent the weight which would ballance the force of the ſtream when its velocity is a, and p the weight which would ballance the force of the ſame ſtream if its velocity was only $a-u$; then $p : A :: \overline{a-u}^2 : a^2$, or $p = A \times \frac{\overline{a-u}^2}{aa}$ and p ſhall repreſent the action of the ſtream upon the wheel. If we abſtract from friction, and have regard to the quantity of the weight only, let it be equal to q A (or be to A as q to 1) and becauſe the motion of the machine is ſuppoſed uniform, $p = q \times A = \frac{A \times \overline{a-u}^2}{aa}$, or $q = \frac{\overline{a-u}^2}{aa}$. The momentum of this weight is q A $u =$

A $u \times a$

$\frac{Au\times\overline{a-u^2}}{aa}$; which is a maximum when the fluxion of $\frac{a\times\overline{a-u^2}}{aa}$ vanishes, that is, when $u\times\overline{a-u^2}-2uu\times a-u=o$, or $a-3u=o$. Therefore, in this case, the machine will have the greatest effect if $u=\frac{a}{3}$, or the weight $q\,A=\frac{A\times\overline{a-u^2}}{aa}=\frac{4A}{9}$. That is, if the weight that is raised by the engine be less than the weight which would ballance the power in the proportion of 4 to 9; and the momentum of the weight is $\frac{4Aa}{27}$.

Prob. III. Suppose that the given weight P (plate LXVI. *fig.* 6.) descending by its gravity in the vertical line, raises a given weight, W, by the cord PMW, (that passes over the pulley M) along the inclined plane BD, the height of which, BA, is given; and let the position of the plane BD be required, along which W will be raised in the least time from the horizontal line AD to B.

Let $AB=a$, $BD=x$, $t=$ time in which W describes BD; then the force which accelerates the motion of W is $P-\frac{aW}{x}$, tt is as $\frac{xx}{Px-aW}$, and if we suppose the fluxion of this quantity to vanish, we shall find $x=\frac{2aW}{P}$, or $P=\frac{2aW}{x}$; consequently the plane BD required is that upon which a weight equal to 2W would be sustained by P; or if BC be the plane upon which W would sustain P, then $BD=2BC$. But if the position of the plane BD be given, and W being supposed variable, it be required to find the ratio of W to P, when the greatest momentum is produced in W along the given plane BD; in this case W ought to be to P as BD to $BA+\sqrt{BD+BA}+\sqrt{BA}$.

Questions of this kind may be likewise demonstrated from the common elementary geometry, of which the following may serve as an example:

Problem IV. Let a fluid, moving with the velocity and direction AC (*fig.* 7.) strike the plane CE, and suppose that this plane moves parallel to itself in the direction CB, perpendicular to CA, or that it cannot move in any other direction; then let it be required to find the most advantageous position of the plane CE, that it may receive the greatest impulse from the action of the fluid. Let AP be perpendicular to CE in P, draw AK parallel to CB, and let PK be perpendicular upon it in K; and AK will measure the force with which any particle of the fluid impels the plane EC, in the direction CB. For the force of any such particle being represented by AC, let this force be resolved into AQ parallel to EC, and AP perpendicular to it; and it is manifest, that the latter AP only has any effect upon the plane CE. Let this force AP be resolved into the force AL, perpendicular to CB, and the force AK parallel to it; then it is manifest, that the former, AL, has no effect in promoting the motion of the plane CE, in the direction CB. Let EM and EN be perpendicular to CA and CB, in M and N; and the number of particles, moving with directions parallel to AC, incident upon the plane CE, will be as EM. Therefore the effort of the fluid upon CE, being as the force of each particle, and the number of particles together, it will be as $AK\times EM$; or, because AK is to AP(=EM) as EN to CE, as $\frac{EM^2\,EM\times EN}{CE}$; so that CE being given, the problem is reduced to this, to find when $EM^2\times EN$ is the greatest possible, or a maximum. But because the sum of EM^2 and of EN^2 (=CM^2) is given, being always equal to CE^2, it follows that $EN^2\times EM^4$ is greatest when $EN^2=\frac{1}{3}CE^2$; for when the sum of two quantities AC and CB (*fig.* 8.) was given, $AC\times CB^2$ is greatest when $AC=\frac{1}{3}AB$, as will be very evident if a semicircle is described upon AD. But when $EN^2\times EM^4$ is greatest, its square root $EN\times EM^2$ is of necessity at the same time greatest. Therefore the action of the fluid upon the plane CE in the direction CB is greatest when $EN^2=\frac{1}{3}CE^2$, and consequently $EM^2=\frac{2}{3}CE^2$; that is, when EM, the sine of the angle ACE, in which the stream strikes the plane, is to the radius, as $\sqrt{2}$ to $\sqrt{3}$; in which case it easily appears from the trigonometrical tables, that this angle is of 54° 44′.

Several useful problems in mechanics may be resolved by what we have just now shewn. If we represent the velocity of the wind by AC (*fig.* 7.) a section of the sail of a windmill perpendicular to its length, by CE, as it follows from the nature of the engine, that its axis ought to be turned directly to the wind, and the sail can only move in a direction perpendicular to the axis, it appears, that, when the motion begins, the wind will have the greatest effect to produce this motion, when the angle ACE in which the wind strikes the sail is of 54° 44′. In the same manner, if CB represent the direction of the motion of a ship, or the position of her keel, abstracting from her lee-way, and AC be the direction of the wind, perpendicular to her way, then the most advantageous position of the sail CE, to promote her motion in the direction CB, is when the angle ACE, in which the wind strikes the sail, is of 54° 44′. The best position of the rudder, where it may have the greatest effect in turning round the ship, is determined in like manner.

MAY, *Maius*, the fifth month of the year, consisting of thirty-one days. See the articles MONTH and YEAR.

MAYOR, the chief magistrate of a city or town, chosen annually out of the aldermen.

MEAD, a liquor made of honey, and held in great eſtimation by moſt of the northern nations, but perhaps not eſteemed here ſo much as it might deſerve, if due care was taken to prepare it properly.

All the writers who have hitherto treated of this ſubject, have given into a capital error with regard to the ſtrength of this liquor, by directing too great a proportion of honey to be diſſolved in the water. The uſual practice of making it ſo ſtrong as to bear an egg, is very wrong. The liquor is thereby rendered a mere ſtum, and this bad quality is ſtill increaſed by the long boiling generally practiſed. It ſcarcely poſſible to procure honey ſo pure, but that ſome bee bread, wax, or other ſubſtance is mixed with it, and this cannot be perfectly ſeparated from it, but by boiling. On this account the boiling of mead ſeems indiſputably neceſſary. In order the more effectually to ſeparate theſe impurities from the liquor, it will be adviſeable to mix ſome whites of eggs with it before it is put on the fire, and it will be particularly neceſſary to ſkim off the thick ſcum that riſes, the moment the liquor begins to boil; and this muſt be attentively continued ſo long as it boils. The only method of boiling being here to ſeparate the impurities, and to make a perfect union of the water and the honey, both which purpoſes are very ſoon obtained, it evidently appears that the boiling need be of but very ſhort duration. This becomes here more peculiarly neceſſary, becauſe the liquor will be the leſs diſpoſed to ferment kindly, the longer the boiling has been continued. It is perhaps owing to the ſingle article of long boiling, that mead has hitherto lain under ſo great diſcredit; becauſe it then never fermented ſufficiently to take off its luſcious ſweetneſs; whereas had it undergone a due fermentation, that ſweetneſs would have gone off, and the mead would have attained a fine racy flavour.

Some notable houſewifes have added hops to their mead. This helps to take off its ſweetneſs, and, as the bitterneſs of the hop goes off, gives it a pleaſant flavour. A ferment is here, as in all liquors that are boiled, generally wanted to bring on a perfect fermentation: but as the leaſt taint in the ferment is communicated to the whole liquor, particular care ſhould be taken that it be very ſweet and good. Mead, judiciouſly managed on theſe principles, will keep for years, and be improved by age.

MEADIA, in botany, the ſame with the dodecatheon of Linnæus. See DODECATHEON.

MEADOW, in its general ſignification, means paſture, or graſs land, annually mowed for hay; but is more particularly applied to lands that are ſo low as to be too moiſt for cattle to graze upon them in the winter, without ſpoiling the ſward.

Too much or too little water is almoſt equally prejudicial to meadows, but the beſt land for meadows is a rich ſoil, that has a moiſt bottom, eſpecially where a ſmall brook may be brought over it, and where there is ſuch a deſcent that the water will not lodge: theſe are better than thoſe by great rivers, where the crops are often loſt.

Thoſe that may be overflowed at pleaſure, are called water-meadows; theſe ſhould never be overflowed till the end of March, except once or twice in winter, when there are ſuch floods as bring down a great deal of ſoil from the upper-lands, and if the ſeaſon ſhould prove dry, it will be of great ſervice to the graſs, if the meadows are overflowed again; but then the cattle ſhould not be turned in till the ſward is dry enough to bear their weight. Miller recommends the weeding of meadows in April and October, with a ſpaddle, and rolling them with a heavy roller in ſpring and autumn. See PASTURE.

MEAN, in general, denotes the middle between two extremes: thus we ſay, mean diſtance, mean proportion, &c.

MEASLES, in medicine, a cutaneous diſeaſe, attended with a fever, in which there is an appearance of eruptions that do not tend to ſuppuration.

The meaſles are in general not dangerous, unleſs from an inſalubrious epidemical conſtitution of the year, which ſometimes renders them malignant: which may be known by a ſudden loſs of ſtrength, coldneſs of the extreme parts, great reſtleſſneſs, and a delirium. Thoſe who die of the meaſles are generally ſuffocated on the ninth day. Some have a looſeneſs, which continues ſeveral weeks, and brings on a mortal tabes. Some have a ſlow fever, with an atrophy and a ſwelling of the abdomen, which are fatal; and when a cough and hoarſeneſs remain after the diſeaſe, a conſumption will follow without ſpeedy aſſiſtance.

If children are ſuſpected to abound with crudities in the inteſtines, it will be proper to evacuate with half a grain of tartar emetic, and ſyrup of ſuccory with rhubarb. When there are worms, anthelmintics ſhould be given. In adults abounding with blood, phlebotomy is neceſſary on the firſt days; and as ſoon as the eruption is ended a gentle cathartic is proper: in a cough, nothing is better than oil of almonds freſh drawn, mixt with ſyrup of capillaire; half a ſpoonful of which ſhould be often given in water-gruel. The patient ſhould keep his bed for two days after the firſt eruption, and take abſorbent and diaphoretic powders, to which half a grain of ſaffron may be added; theſe ſhould be taken every night from the firſt onſet of the diſeaſe, till the patient recovers, encreaſing or diminiſhing the doſe according to his age. If after the meaſles diſappear, they ſhould be followed by a difficulty of breathing, a fever, and other ſymptoms of an inflammation of the lungs, let blood be taken freely from the arm, once, twice, or three times, as occaſion ſhall require, leaving a due ſpace between each bleeding, and

give

give oil of ſweet almonds, and about twelve days from the invaſion let the patient be purged. The diet ought to be the ſame as in the ſmall-pox, taking particular care that the body be kept lax rather than bound up, through the courſe of the diſtemper. See Pox.

MEASURE, *Menſura*, in geometry, denotes any quantity aſſumed as one, or unity, to which the ratio of other homogeneous or ſimilar quantities is expreſſed. This definition is ſomewhat more agreeable to practice than that of Euclid, who defines meaſure, a quantity which being repeated any number of times, becomes equal to another. This latter definition anſwers only to the idea of an arithmetical meaſure, or quota-part.

MEASURE *of an Angle*, is an arch deſcribed from the vertex in any place between its legs.

Hence angles are diſtinguiſhed by the ratio of the arches, deſcribed from the vertex between the legs to the peripheries. Angles then are diſtinguiſhed by thoſe arches; and the arches are diſtinguiſhed by their ratio to the periphery: thus an angle is ſaid to be ſo many degrees as there are in the ſaid arch. See the article ANGLE.

MEASURE *of a Figure*, or plane ſurface, is a ſquare whoſe ſide is one inch, foot, yard, or ſome other determinate length. Among geometricians, it is uſually a rod called a ſquare rod, divided into ten ſquare feet, and the ſquare feet into ten ſquare digits.

MEASURE *of a Line*, any right line taken at pleaſure, and conſidered as unity. The modern geometricians uſe a decempeda, or perch divided into ten equal parts, called feet; the feet they ſubdivide into ten digits, and the digit into ten lines, &c.

MEASURE *of the Maſs, or Quantity of Matter*, in mechanics, is its weight; it being apparent that all the matter which coheres and moves with a body, gravitates with it, and it being found by experiment, that the gravities of homogeneal bodies are in proportion to their bulks; hence, while the maſs continues the ſame, the weight will be the ſame, whatever figure it put on: by which is meant its abſolute weight, for as to its ſpecific, that varies as the quantity of the ſurface varies. See the article GRAVITY and MOMENT.

MEASURE *of a Number*, in arithmetic, ſuch a number as divides another without leaving any fraction: thus 9 is a meaſure of 27.

MEASURE *of a Solid*, is a cube whoſe ſide is one inch, foot, yard, or any other determinate length. In geometry, it is a cubic perch, divided into cubic feet, digits, &c. hence cubic meaſures, or meaſures of capacity. See the articles SPHERE, CUBE, &c.

MEASURE *of Velocity*, in mechanics, the ſpace paſſed over by a moving body in a given time. To meaſure a velocity therefore, the ſpace muſt be divided into as many equal parts as the time is conceived to be divided into; the quantity of ſpace anſwering to ſuch an article of time is the meaſure of the velocity. See the article VELOCITY.

MEASURE, in a legal and commercial ſenſe, denotes a certain quantity or proportion of any thing bought, ſold, valued, or the like. Meaſures are then various, according to the various kinds and dimenſions of the things meaſured. Hence ariſe lineal or longitudinal meaſures, for lines or lengths; ſquare meaſures, for areas or ſuperficies; and ſolid or cubic meaſures, for bodies and their capacities. All which again are very different in different countries, and in different ages, and even many of them for different commodities. Whence ariſe other diviſions of ancient and modern meaſures, domeſtic and foreign ones, dry meaſures, liquid meaſures, &c.

Long MEASURES, or MEASURES *of Application*. The Engliſh ſtandard long meaſure for commerce, or that whereby the quantities of things are ordinarily eſtimated in the way of trade, is the yard, containing three Engliſh feet. Its diviſions are the foot, ſpan, palm, inch, and barley-corn; its multiples the pace, fathom, pole, furlong, and mile. The proportions theſe ſeverally bear to each other, are expreſſed in the following table:

English MEASURES of Length.

Barley-corns	Inch	Palm	Span	Foot	Cubit	Yard	Pace	Fathom	Pole	Furlong	Mile.
3	1										
9	3	1									
27	9	3	1								
36	12	4	1 1/3	1							
54	18	6	2	1 1/2	1						
108	36	12	4	3	2	1					
180	60	20	6 2/3	5	3 1/3	2 1/2	1				
216	72	24	8	6	4	2	1 1/5	1			
594	198	66	22	16 1/2	11	5 1/2	3 3/5	2 3/4	1		
2376	792	264	88	66	44	22	13 1/5	11	4	1	
19008	6336	2112	704	528	352	176	105 6/10	88	32	8	1

Scripture

Scripture-MEASURES of Length reduced to Engliſh.

							Eng. feet.	Eng. inch.	Dec.
Digit	—	—	—	—	—	—	0		0.912
4	Palm	—	—	—	—	—	0		3.648
12	3	Span	—	—	—	—	0		10.944
24	6	2	Cubit	—	—	—	1		9.888
96	24	8	4	Fathom	—	—	7		3.552
144	36	12	6	1½	Ezechiel's reed		10		11.328
192	48	16	8	2	1⅓	Arabian pole	14		7.104
1920	480	160	80	20	13⅓	10 Schœnus or meaſ. line	145		11.04

The Longer Scripture-MEASURES.

					Engliſh miles	paces	feet.
Cubit	—	—	—	—	0	0	1.824
400	Stadium	—	—	—	0	145	4.6
2000	5	Sab. day's journey	—		0	729	3.000
4000	10	2	Eaſtern mile	—	1	403	1.000
12000	30	6	3	Paraſang	—	4	153	3.000
96000	240	48	24	8	a day's journey		33	172	4.000

A Table of the MEASURES of Length of the principal Places in Europe, compared with the Engliſh Yard.

		Eng. yard.
100	Aunes or ells of England equal to —	125
100	of Holland or Amſterdam —	75
100	of Brabant or Antwerp — —	76
100	of France — — — —	128¼
100	of Hamburgh, Francfort, &c. —	62½
100	of Breſlau — — — — —	60
100	of Dantzick — — — —	66¾
100	of Bergen and Drontheim —	68¼
100	of Sweden or Stockholm — —	65¾
100	of St. Gall, for linnens — —	87½
100	of ditto, cloths — — — —	67
100	of Geneva — — — —	124¾
100	Canes of Marſeilles and Montpelier	214½
100	of Toulouſe and High Languedoc	200
100	of Genoa, of 9 palms — —	245¼
100	of Rome — — — —	227¼
100	Varas of Spain — — —	93¾
100	of Portugal — —	123
100	Cavidos of Portugal — — — —	75
102	Braſſes of Venice — — — — —	73½
100	of Bergamo, &c. — — —	71¼
100	of Florence and Leghorn — —	64
100	of Milan — — — — —	58½

N. B. The aunes or ells of Amſterdam, Haerlem, Leyden, the Hague, Rotterdam, and other cities of Holland, as alſo that of Nuremberg, being all equal, are comprehended under that of Amſterdam; as thoſe of Oſnabrug are under thoſe of France; and thoſe of Bern and Baſil are equal to thoſe of Hamburg, Francfort, and Leipſic.

For the ſubdiviſions and multiples of each of theſe meaſures of length, ſee the article AUNE, &c.

For the proportion of the feet of the principal nations in Europe, compared with the Engliſh foot, ſee the article FOOT.

Square, or *Superficial* MEASURES. Engliſh ſquare or ſuperficial meaſures are raiſed from the yard of 36 inches multiplied into itſelf, and thus producing 1296 ſquare inches in the ſquare yard: the diviſions of this are ſquare feet and inches; and the multiples, poles, roods, and acres, as in the following table:

Engliſh Square-MEASURES.

Inches					
144	Feet				
1296	9	Yards			
3600	25	2⅞	Paces		
39204	272¼	30¼	10.89	Poles	
1568160	10890	1210	435.6	40	Rood
6272640	43560	4840	1743.6	160	4 Acre.

Grecian ſquare-meaſures were the plethron, or acre, by ſome ſaid to contain 1444, by others 10000 ſquare feet; and the aroura, the half of the plethron. The aroura of the Egyptians was the ſquare of 100 cubits.

Cubical MEASURES, or *Meaſures of Capacity for Liquids*.—The Engliſh meaſures were originally raiſed from troy-weight; it being enacted by ſeveral ſtatutes that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, ſhould weigh a gallon of wine-meaſure, the diviſions and multiples whereof were to form the other meaſures; at the ſame time it was alſo ordered, that there ſhould be but one liquid meaſure in the kingdom: yet cuſtom has prevailed, and there having been introduced a new weight, viz. the avoirdupois, we have now a ſecond ſtandard-gallon adjuſted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter ſtandard are raiſed two ſeveral meaſures, the one for ale, the other for beer.

The ſealed gallon at Guildhall, which is the ſtandard for wines, ſpirits, oils, &c. is ſuppoſed to contain 231 cubic inches; and on this ſuppoſition the other meaſures raiſed therefrom, will contain as in the following table: yet by actual experiment, made in 1688, before the lord-mayor and the commiſſioners of exciſe, this gallon was found to contain only 224 cubic inches: it was however agreed to continue the common ſuppoſed contents of 231 cubic inches; ſo that all computations ſtand on their old footing. Hence as 12 is to 231, ſo is $14\frac{12}{20}$ to $281\frac{1}{2}$ the cubic inches in the ale-gallon: but in effect the ale-quart contains $70\frac{1}{2}$ cubic inches, on which principle the ale and beer-gallon will

will be 282 cubic inches. The ſeveral diviſions and multiples of theſe meaſures, and their proportions, are exhibited in the following tables:

English MEASURE of Capacity for Liquids.
Wine-meaſure.

Solid inches								
28⅞	Pint							
231	8	Gallon						
4158	144	18	Rundlet					
7276½	252	31½	1¾	Barrel				
9702	336	42	2⅓	1⅓	Tierce			
14553	504	63	3½	2	1½	Hogſhead		
19279	672	84	4⅔	2⅔	2	1⅓	Puncheon	
29106	1008	126	7	4	3	2	1½	Butt
58212	2016	252	14	8	6	4	3	2 Tun.

Ale-Meaſure.

Pints				
8	Gallon			
64	8	Firkin		
128	16	2	Kilderkin	
256	32	4	2	Barrel
384	48	6	3	1½ Hogſhead.

Beer-Meaſure.

Pints				
72	Gallon			
8	9	Firkin		
144	18	2	Kilderkin	
288	36	4	2	Barrel
533	54	6	3	1½ Hogſhead.

Jewiſh MEASURES of Capacity for Liquids, reduced to Engliſh Wine-meaſure.

							Gall.	pts.	Solid inches.
Caph	—	—					0	0⅝	0.177
1⅓	Log	—	—	—			0	0⅚	0.211
5⅓	4	Cab	—	—			0	3⅓	0.844
16	12	3	Hin	—	—		1	2	2.533
32	24	6	2	Seah	—	—	2	4	5.067
96	72	18	6	3	Bath, or Epha		7	4	15.2
960	720	180	60	30	10	Coron or Chomer	75	5	7.625

In the modern liquid-meaſures of foreign nations, it is to be obſerved, that their ſeveral veſſels for wine, vinegar, &c. have alſo various denominations, according to their different ſizes, and the places wherein they are uſed. The Woeders of Germany, for holding Rheniſh and Moſelle wines, are different in their gauges; ſome containing 14 aumes of Amſterdam meaſure, and others more or leſs. The aume is reckoned at Amſterdam for 8 ſteckans or 20 verges, or for ⅛ of a ton of 2 pipes; or 4 barrels of France or Bourdeaux, which ⅛ at this latter place is called tiercon, becauſe 3 of them make a pipe or 2 barrels, and 6 the ſaid ton. The ſteckan is 16 mingles, or 32 pints; and the verge is, in reſpect of the ſaid Rheniſh and Moſelle and ſome other ſorts of wine, of 6 mingles; but in meaſuring brandy, it conſiſts of 6⅛ mingles. The aume is divided into 4 anckers, and the ancker in to 2 ſteckans, or 32 mingles. The ancker is taken ſometimes for 1/24 of a ton, or 4 barrels, on which footing the Bourdeaux barrel ought to contain at Amſterdam (when the caſk is made according to the juſt gauge) 12½ ſteckans, or 200 mingles, wine and lees; or 12 ſteckans, or 192 mingles racked wine; ſo that the Bourdeaux ton of wine contains 50 ſteckans, or 800 mingles, wine and lees; and 48 ſteckans, or 768 mingles of pure wine. The barrels or poinçons of Nantes and other places on the river Loire, contain only 12 ſteckans Amſterdam meaſure. The wine ton of Rochelle, Cognac, Charente, and the Iſle of Rhé, differs very little from the ton of Bourdeaux, and conſequently from the barrels and pipes. A ton of wine of Chaloſſe, Bayonne, and the neighbouring places, is reckoned 60 ſteckans, and the barrel 15, Amſterdam meaſure.

The muid of Paris contains 150 quarts, or 300 pints, wine and lee; or 280 pints clear wine; of which muids 3 make a ton, and the fractions are,

The muid	containing	36 ſetiers
The ſetier		4 quarts
The quart		2 pints
The pint		2 chopins
The chopin		2 demi-ſetiers
The demi-ſetier		2 poiſſons.

The muid is alſo compoſed of pipes, or poinçons, quarteaux, queves, and demiqueves: theſe poinçons of Paris and Orleans contain about 15 ſteckans Amſterdam-meaſure, and ought to weigh with the caſk 666 ℔. a little more or leſs. In Provence they reckon by milleroles, and the millerole of Toulon contains 66 Paris-pints, or 100 pints of Amſterdam, nearly; and the Paris-pint is nearly equal to the Engliſh wine-quart.

The butts or pipes from Cadiz, Malaga, Alicant, Benecarlo, Saloe, and Mataro, and from the Canaries, from Liſbon, Oporto, and Fayal, are very different in their gauges, tho' in affreightments they are all reckoned two to the ton.

Vinegar is meaſured in the ſame manner as wine; but the meaſures for brandies are different: theſe ſpirits from France, Spain, Portugal, &c. are generally ſhipped in large caſks called pipes, butts, and pieces, according to the places from whence they are exported, &c. In France, brandy is ſhipped in caſks called pieces at Bourdeaux, and pipes at Rochelle, Cognac, the Iſle of Rhé, and other neighbouring places, which contain ſome more and ſome leſs: even from 60 to 90 Amſterdam-verges or veertels, according to the capacity of the veſſels, and the places they come from, which being reduced into barrels, will ſtand as follows, viz.

At Rochelle, Cognac, the Isle of Rhé, and the country of Aunis	27 veertels	per barrel.
At Nants, and several places of Bretagne and Anjou — —	29 veertels	
At Bourdeaux, and different parts of Guienne — —	32 verges	
At Amsterdam, and other cities of Holland — — —	30 veertels	
At Hamburgh and Lubeck —	30 verges	
At Embden — —	27 verges	

In Provence and Languedoc, brandy is sold by the quintal, the casks included; and at Bruges, in Flanders, the verges are called sesters of 16 stops each, and the spirit is sold at so much per stop.

Olive-oil is also shipped in casks of various sizes, according to the custom of the places where it is embarked, and the conveniency of stowage. In England it is sold by the ton of 236 gallons; and at Amsterdam by the ton of 717 mingles, or 1434 pints. In Provence it is sold by milleroles of 66 Paris-pints: from Spain and Portugal it is brought in pipes, or butts, of different gauges; at the first place it is sold by roves, whereof 40 go to the butt; and at the latter place by almoudas, whereof 26 make a pipe. Train-oil is sold in England by the ton, at Amsterdam by the

MEASURES *of Capacity for Things dry.* English dry or corn-measures are raised from the Winchester-gallon, which contains 272¼ solid inches, and ought to hold of pure running water 9 pounds 13 ounces. This seems to stand on the foot of the old wine-gallon of 224 cubic inches, 12 being to 14 12/20 as 224 to 272 ¼; but by an act of parliament made in 1697 it is decreed, that a round bushel, 18½ inches wide, and 8 deep, is a legal Winchester-bushel. Now such a bushel will only hold 2150.42 cubic inches, consequently the gallon will hold 268.8 cubic inches, the divisions and multiples whereof are in the following table:

English Dry or Corn-MEASURE.

Solid inches					
33.6	Pint				
268.8	8	Gallon			
537.6	16	2	Peck		
2150.4	64	8	4	Bushels	
17203.2	512	64	32	8	Quarter.

Scripture MEASURES of Capacity for Things dry, reduced to English Corn-measure.

						Peck	Gal.	Pint.	solid inch. dec.
Gachal			—		—	0	0	0 1 17/20	0.031
20	Cab		—		—	0	0	2 5/6	0.073
36	1⅘	Gomer	—		—	0	0	5 1/10	1.211
120	6	3½	Seah		—	1	0	1	4.036
360	18	10	3	Epha	—	3	0	3	12.107
1800	90	50	15	5	Leteeh	16	0	0	26.500
3600	180	100	30	10	2 Chomer, or Coron	32	0	1	18.969

In the several parts of Europe, salt, which is a more staple and current commodity than any other, is bought and sold by different measures, according to the several places of its dispatch: at Amsterdam it is sold by the cent of 404 measures, or scheppels, which cent is reckoned to be seven lasts, or 14 tons, and the last is to weigh 4000 lb. the seven lasts making 28000 lb. called the cent of salt, which also contains 208 sacks; though some of this commodity is much heavier than others. In the cities of France, salt is sold by the muid, whose size varies according to the different places of its manufacture and dispatch. At Paris this measure is reckoned to contain 12 setiers, or 48 minots, which minot is also divided into other measures. The cent of salt from Marans, Brouage, Sude, and the Isle of Rhé, contain 28 stricken muids, and each muid 24 boiseaux, which yields at Amsterdam 11½ lasts, or 23 tons, more or less. In Copenhagen, the said cent renders only 9½ lasts, the last being reckoned here equal to 18 tons, and 50 lasts to correspond with 52 of Coningsberg, at which place the cent produces about 10 lasts, or 40,000 lb. At Riga the said cent yields the same measure as at Coningsberg, and about 6¼ lasts of Riga, make the great cent of Amsterdam. The said French cent produces at Dantzick from 11½ to 12 lasts, of which lasts from 7¼ to 7½, make likewise the great cent of Amsterdam. At Stetin in Pomerania, the French cent yielded 10 lasts, making 40,000 measure and weight of the said place. In Portugal it is bought by the muid, of which four make a last, and seven the cent of Amsterdam. At Alamat and Ivica it is sold by the modin, which weighs from 27½ to 28 hundred weight English.

MEASURE *of Wood*, for firing. See the article CORD *of Wood.*

MEASURE *for Horses*, is the hand, which by statute contains four inches.

MEASURE is also used to signify the cadence and time observed in poetry, dancing, and music, to render them regular and agreeable. See METRE.

MEASURE, in music, the interval or space of time which the person who beats time takes between the rising and falling of his hand, in order to conduct the movement sometimes quicker and sometimes slower, according to the music or subject that is to be sung or played. See TIME.

MEATUS AUDITORIUS, in anatomy, the auditory passage. See the article EAR.

MECHANICS, that branch of mathematics which considers motion and moving powers, their nature and laws, with their effects in machines.

The knowledge of mechanics is one of those things, says Mr. Mac Laurin, that serves to distinguish civilized nations from barbarians. It is by this science, that the utmost improvement is made of every power and force in nature; and the motions of the elements, water, air, and fire, are made

made ſubſervient to the various purpoſes of life: for however weak the force of man appears to be, when unaſſiſted by this art; yet, with its aid, there is hardly any thing above his reach. It is diſtinguiſhed, by Sir Iſaac Newton, into practical and rational mechanics; the former of which treats of the mechanical powers, viz. the lever, ballance, axis and wheel, pulley, wedge, ſcrew, and inclined plane. See the articles LEVER, BALLANCE, &c.

Rational mechanics comprehends the whole theory of motion; ſhews, when the powers or forces are given, how to determine the motions that are produced by them; and, converſely, when the phænomena of the motions are given, how to trace the powers or forces from which they ariſe. See MOTION.

MECHANICAL, an epithet applied to whatever relates to mechanics: thus we ſay, mechanical powers, cauſes, &c. See the articles POWER, CAUSE, &c.

The mechanical philoſophy is the ſame with what is otherwiſe called corpuſcular philoſophy. See the article CORPUSCULAR.

MECHANICAL, in mathematics, denotes a conſtruction of ſome problem, by the aſſiſtance of inſtruments, as the duplicature of the cube and quadrature of the circle, in contradiſtinction to that which is done in an accurate and geometrical manner.

MECHANICAL *Curve*, is a curve, according to Deſcartes, which cannot be defined by any algebraic equation: and ſo ſtands contradiſtinguiſhed from algebraic or geometrical curve.

Leibnitz and others call theſe mechanical curves tranſcendental, and diſſent from Deſcartes in excluding them out of geometry. Leibnitz found a new kind of trancendental equations, whereby theſe curves are defined: but they do not continue conſtantly the ſame in all points of the curve, as algebraic ones do.

MECHOACAN, in the materia medica, the root of an American convolvulus, brought chiefly from a province in Mexico of the ſame name, in thin tranſverſe ſlices, like jalap, but larger and whiter.

This root was firſt introduced about the year 1524, and continued in eſteem for a conſiderable time, as a mild cathartic, of very little taſte or ſmell, not liable to offend the ſtomach, of ſlow operation, but effectual and ſafe: by degrees it gave place to jalap, which has now, among us, almoſt wholly ſuperſeded its uſe. It ſeems to differ from jalap only in being weaker: the reſins obtained from the two roots have the ſame qualities, but mechoacan ſcarcely yields one ſixth part ſo much as jalap does, and hence requires to be given in muchlarger doſes to produce the ſame effects. The doſe of the mechoacan in ſubſtance is from one dram to two or more.

MECONIUM, in medicine, a black thick fœces gathered in the inteſtines of infants, and brought with them into the world at the time of their birth. The retention of theſe fœces is one of the diſeaſes to which infants are liable.

MECONIUM, in pharmacy, the extract of Engliſh poppies.

MEDAL, a piece of metal in the form of coin, intending to convey to poſterity the portrait of ſome great perſon, or the memory of ſome illuſtrious action.

The parts of a medal are the two ſides, one of which is called the face, or head, and the other the reverſe. On each ſide is the area, or field, which makes the middle of the metal; the rim, or border; and the exergue; and on the two ſides are diſtinguiſhed the type, or the figure repreſented, and the legend, or inſcription.

There was formerly no difference between money and medals. An old Roman had his purſe full of the ſame pieces that we now preſerve in cabinets. As ſoon as an emperor had done any thing remarkable, as gaining a victory, giving up a tax, or the like, it was immediately ſtamped on a coin, and became current through his whole dominions. This was a pretty device to ſpread abroad the virtues of an emperor, and make his actions circulate; and thus a freſh coin was a kind of gazette, that publiſhed the lateſt news of the emperor.

MEDALLION, or MEDALION, a medal of an extraordinary ſize, ſuppoſed to be anciently ſtruck by the emperors for their friends, and for foreign princes and embaſſadors; but that the ſmallneſs of their number might not endanger the loſs of the devices they bore, the Romans generally took care to ſtamp the ſubject of them upon their ordinary coins.

Medallions, in reſpect of the other coins, were the ſame as modern medals in reſpect of modern money: they were exempted from all commerce, and had no other value but what was ſet upon them by the fancy of the owner. Medallions are ſo ſcarce that there cannot be any ſet made of them, even though the metals and ſizes ſhould be joined promiſcuouſly.

MEDEOLA, in botany, a genus of the hexandria-trigynia claſs of plants, the flower of which conſiſts of ſix oblong, patent, and revolute petals: the fruit is a berry of a roundiſh form, with three cells, in each of which is contained a ſingle cordated ſeed.

MEDIAI, or ALLIGATION MEDIAL, in arithmetic. See ALLIGATION.

MEDIANA, a vein formed by the concourſe of the cephalic and baſilic veins in the bend of the elbow.

MEDIASTINUM, in anatomy, is a double membrane continuous to the ſternum, ſituated un-

de-

der it, and adhering firmly to it. It divides the cavity of the thorax longitudinally into two parts: but as it is not exactly under the middle of the ſternum, but ſomewhat to the left-ſide, the right part of the thorax is larger than the left.

MEDIASTINUM CEREBRI, the ſame with the tranſverſe ſeptum of the brain. See BRAIN.

MEDIATE, or INTERMEDIATE, ſomething that ſtands between and connects two or more terms, conſidered as extremes; in which ſenſe it is oppoſed to immediate.

MEDICAGO, in botany, a genus of the diadelphia-decandria claſs of plants, with a papilionaceous flower, and a long compreſſed and crooked pod for its fruit.

This genus comprehends the medicago, medica falcata, and cochleata of authors.

MEDICINE, *Medicina*, or *Phyſic*, the art of healing, which, according to Boerhaave, conſiſts in the knowledge of thoſe things, by whoſe application life is either preſerved ſound and healthy, or, when diſordered, again reſtored to its priſtine healthineſs.

Medicine is undoubtedly of the ſame date with diſeaſes, and diſeaſes are almoſt as ancient as the world itſelf. Men were long each his own phyſician; and it is hard to fix the time when it firſt was made an art and profeſſion. In certain countries thoſe who had been cured of ſome diſeaſe, wrote down how and by what remedies it had been affected, and depoſited thoſe accounts in the temples for the inſtruction of others in the like caſe. In other places, as Egypt and Babylon, the ſick were expoſed in public, that ſuch as paſſed by, who might have been cured of the ſame diſeaſe, might give them advice.

The Egyptians cultivated medicine both more anciently and more learnedly than any other people. The Greeks diſputed that glory with them, or at leaſt followed them very cloſe in it.

Before the Trojan war, Chiron the Theſſalian, ſurnamed the Centaur, who was Achilles's governor, made himſelf famous by the cure of wounds, and knowledge of ſimples. Æſculapius, Chiron's diſciple, did not give place to his maſter. Celſus places Pythagoras, Empedocles, and Democritus, in the number of celebrated phyſicians.

Phyſicians were diſtinguiſhed into different claſſes, namely, empirics, becauſe they followed experience almoſt entirely; others, of whom Hippocrates was the chief, joined reaſon with experience, hence called dogmatic or rational. Hippocrates firſt applied himſelf to the ſtudy of natural things in general, and afterwards to that of the human body in particular. He made a great proficiency in all the parts of phyſic. He was born 460 years before Chriſt, and was cotemporary with Democritus. He compiled a body of Greek medicine, which continued a long time ſacred and unaltered, and was the ſtanding practice of many ages. At length Aretæus the Cappadocian digeſted it into an orderly body; after which it was ſeveral times altered and improved, till at length it was taken in hand by Galen of Pergamos, who lived in the year 131. He aſcribed all he knew to Hippocrates, and explained every thing by the rigid doctrines of the peripatetics; and did both a great deal of ſervice, and a great deal of miſchief to the art; he being the firſt who introduced the doctrine of the elements, the cardinal qualities, the degrees, the four humours, &c. into medicine, and on which he made the whole art depend.

Other famous phyſicians after Hippocrates, were Diocles Caryſtius, Praxagoras, Chryſippus, Eraſiſtrates, Herophilus, Serapion, Apollonius, Glaucias, Heraclides, Tarentinus, Dionyſius, Crito, Menodotus, Theodas, Aſclepiades, Themiſon, Theſſalus, Soranus, Cælius Aurelianus, Celſus, Oribaſius, Aetius, Alexander Trallianus, Paulus Ægineta, Actuarius, Myrepſus, &c.

Phyſic had for ſome time got almoſt entirely into the hands of the Arabians, till the end of the fifteenth century, when the original authors, moſt of which they had tranſlated, came to be read in their own language; at length, the immortal Harvey, overturning the whole theory of the ancients, by the diſcovery of the circulation of the blood, laid a new and certain baſis for medicine. Since his time, it is improved by ſure diſcoveries in anatomy, chemiſtry, mechanics, &c.

It does not appear that phyſicians were very common among the Hebrews, eſpecially for internal maladies; but for wounds, fractures, bruiſes, and all external injuries, they had phyſicians who underſtood the dreſſing of them, and the application of certain medicaments, as roſin, balm, fat, &c. The Jewiſh authors ſpeak very unfavourably of phyſicians.

We are told by Pliny, that Archagathus of Peloponneſus was the firſt phyſician that came to Rome in the conſulſhip of L. Æmilius and L. Julius, A. U. C. 535. That is, the Romans, till his arrival, uſed only the ſimple empiric kind of phyſic, ſuch as was practiſed by the firſt men. It ſeems, however, that ſeveral phyſicians came from Greece to Rome, though Cato had oppoſed it with his whole power.

Till Pliny's time, of all profeſſions, that of medicine, as gainful as it was, was the only one no Roman had followed, becauſe they thought it below them.

Without entirely deciding, as to the merit of the ancient and modern phyſic, they have each their peculiar advantages, which render both highly eſtimable; and no doubt but the experience of many ages muſt have added conſiderable lights to the knowledge

knowledge of the ancients. The new diſcoveries which have enriched the phyſic of the moderns may give it the preference to that of the ancients.

The phyſic of the ancients is perhaps to be preferred to that of the moderns, in being leſs profuſe of medicines in ſickneſs, and leſs deſirous to precipitate cures; in obſerving the motions of nature with more attention, and aſſiſting them with greater confidence; and in being contented to divide the honour of the cure with nature, without arrogating the whole glory of it to itſelf.

Phyſic, however uſeful and ſalutary, has had the misfortune of being made the butt of great men, eſpecially among the Romans. Cato declared himſelf moſt ſtrenuouſly againſt phyſicians, as we ſee in a letter to his ſon preſerved by Pliny; but it is to be obſerved, that he means only the phyſicians from Greece. Pliny the naturaliſt was of much the ſame way of thinking, but his complaints extend only to perſons of no repute, authority, or learning.

Extremes are not to be admitted upon this head, in which blind confidence and ill-grounded contempt may be equally dangerous.

In ſhort, whether we conſider our bodies or our medicines, phyſic muſt be very precarious. Our bodies are more compounded and unequal than other bodies are; moſt other creatures live on a ſimple diet, and are regular in their appetites; whereas man feeds almoſt upon every thing, and, where appetite fails, invention is called in to ſwell the account by high ſauces and rich ſpices. Hence proceed ſuch variety of diſeaſes as diſtract the phyſician's ſkill. A healthy conſtitution is eaſily reſtored when out of order, nature in a great meaſure does its own work; whereas, in a diſordered body, a phyſician muſt give a new conſtitution before he can perfect the cure.

Though our materia medica be large enough, and to look into our diſpenſatories, one would think no diſeaſe incurable; yet the miſchief is, all thoſe fine medicines do not always anſwer in the application, nor have they been found ſo ſovereign in our bodies, as they are in our books: all which things have ſo diſtracted our phyſicians that they vary even in the moſt common method. In one age alkalies are in faſhion, and in the next acids begin to recover credit: bleeding is practiſed by one nation, and condemned by their neighbours, &c.

Medicine is divided into five principal branches: the firſt conſiders the human body, life, and health, and the effects flowing therefrom; this is called phyſiology, the doctrine of the œconomy or uſe of the parts; and its objects are called res naturales, or things according to nature.

The ſecond branch conſiders the diſeaſes of the human body, their differences, cauſes, and effects: as it conſiders diſeaſes, it is called pathology; as it enquires into the cauſes, ætiology; when it examines their differences, it is called noſology; and when it explains their effects, ſymptomatology. The objects of this branch are called res preternaturales, or beyond nature.

The third branch conſiders the ſigns or ſymptoms, and how to apply them to uſe; ſo as to judge both in a ſound and diſeaſed body what is or will be the degree, order, and effect of the health or diſeaſe. This is called ſemeiotica. Its objects are things both natural, non-natural, and preternatural.

The fourth branch conſiders the remedies and their uſe, whereby life may be preſerved; whence it is called hygieine. Its objects are what we ſtrictly call non-natural.

The fifth furniſhes the materia medica, its preparation and manner of exhibiting, ſo as to reſtore health; and is called therapeutica, comprizing the diætetica, pharmaceutica, chirurgica, and iatrica.

MEDICINES, *Medicamenta*, whatever ſubſtances ſerve to reſtore health.

MEDIETAS LINGUÆ, in law, ſignifies a jury, or inqueſt impannelled, of which the one half are natives of this land, and the other foreigners.

MEDITULLIUM is uſed by anatomiſts for that ſpungy ſubſtance between the two plates of the cranium, and in the interſtices of all laminated bones. See the article DIPLOE.

MEDIUM, in logic, the mean or middle term of a ſyllogiſm, being an argument, reaſon, or conſideration for which we affirm or deny any thing: or, it is the cauſe why the greater extreme is affirmed or denied of the leſs in the concluſion.

MEDIUM, in philoſophy, that ſpace or region through which a body in motion paſſes to any point; thus æther is ſuppoſed to be the medium through which the heavenly bodies move; air, the medium wherein bodies move near our earth; water, the medium wherein fiſhes live and move; and glaſs is alſo a medium of light, as it affords it a free paſſage. That denſity or conſiſtency in the parts of the medium, whereby the motion of the bodies in it is retarded, is called the reſiſtence of the medium, which together with the force of gravity, is the cauſe of the ceſſation of the motion of projectiles.

Subtile, or *Ætherial* MEDIUM. See ÆTHER.

MEDLAR, *Meſpilus*, in botany, &c. See the article MESPILUS.

MEDULLA, MARROW, in anatomy. See MARROW.

MEDULLA OBLONGATA, is the lower and medullary part of the cerebrum and cerebellum, formed into a kind of tail, and extended to the great foramen or hole in the occipital bone of the cranium, where it gives origin to the ſpinal marrow, and to the nerves of the brain. See the articles BRAIN and NERVE.

MEDULLA SPINALIS, or ſpinal marrow, is a continuation of the medulla oblongata of the brain,

and forms, as it were, a tail to that part. It is included in a kind of bony canal, formed by the vertebræ, and in this is continued from the head to the extremity of the os ſacrum. Its length is therefore the ſame with that of the ſpina dorſi, which is different in perſons of different ſtature. Its thickneſs, in general, is nearly equal to that of a finger; but it is not uniformly of the ſame diameter throughout. Its ſubſtance, in the upper-part, as far as to the laſt vertebra of the thorax, is the ſame with that of the medulla oblongata of the brain, but ſomewhat tougher and more firm: they are externally of a medullary ſubſtance, that the nerves may eaſily make their way out; internally cineritious, and of the ſame nature with the cineritious or cortical part of the brain; but the lower part of them, from the laſt vertebra of the thorax to the extremity of the os ſacrum, is fibrous and very tenacious, and is called cauda equina. The diviſion of the ſpinal marrow is formed by means of a fiſſure; it is by this ſeparated into a right and left part, or into two columns; but this ſeparation is not continued to the center. Its proper integuments are no leſs than ſix: theſe are, 1. the bony canal, formed by the cavities of the twenty-four vertebræ, and the os ſacrum: 2. the tunica, which is very ſtrong, and connects the vertebræ within: 3. the cellular, or adipoſe coat, which, in fat perſons, always contains more or leſs fat, and ſeems deſtined by nature to ſoften the former: 4. the dura mater, which is ſtronger in the upper-part, and finer and weaker in the lower; this looſely incloſes the medulla in the ſpine, and in its anterior part is firmly connected with the vertebræ: 5. the tunica arachnoides, which in its anterior part, adheres very firmly to the pia mater, but in its poſterior part is looſe and fluctuating: 6. the pia mater, which ſurrounds every part of the ſpinal marrow, and all the nerves that ariſe from it, and enters alſo its longitudinal diviſion. The arteries and veins of the ſpinal marrow enter at the apertures of the vertebræ, which give paſſage out to the nerves; they make a multitude of anaſtomoſes, and are derived from the vertebrals of the neck, the intercoſtals and the lumbar. The nerves of the ſpine are thirty-one, or as others count them, thirty-two pair. Theſe are compoſed each of a multitude of fibres, ariſing from the anterior and poſterior parts of the medulla: theſe fibres afterwards unite, and are connected by, and covered with membranes, and in that ſtate they conſtitute what we call nerves.

The uſes of the ſpinal marrow are, to give origin to the before-mentioned pairs of nerves, which are principally diſtributed to the limbs and external parts; and to ſecrete and prepare a nervous fluid.

MEDUSA's HEAD, in aſtronomy. See the article ALGOL.

MEDUSA's HEAD, in botany, the Engliſh name for a ſpecies of euphorbium. See EUPHORBIUM.

MEI, or MISERERE MEI, in medicine. See MISERERE.

MEL, HONEY. See he article HONEY.

MELAMPYRUM, cow-wheat, in botany, a genus of plants, whoſe flower is monopetalous and ringent. The fruit is an oblong, acuminated, compreſſed capſule, with two cells, containing two ovate twin ſeeds.

MELANCHOLY, in medicine, a ſpecies of madneſs, being a kind of a delirium without a fever, uſually attended with fear, heavineſs, and ſorrow, without any apparent cauſe. It is infinitely varied according to the temperament and ideas of the perſon affected therewith. See MADNESS.

The word is Greek, μελαγχολια, and formed of μελας, black, and χολη, bile or gall.

The cauſes evidently productive of melancholy are obſerved to be,

1. All things which fix, exhauſt, or diſturb the nervous fluid of the brain; ſuch as violent and ſudden frights, intenſe thinking upon any ſubject, exceſſive love, watchings, ſolitude, fear, and hyſteric diſorders.

2. Such things as hinder and diſturb the generation, reparation, circulation, and various ſecretions and excretions of the blood, eſpecially in the ſpleen, ſtomach, omentum, pancreas, meſentery, inteſtines, liver, uterus, and hæmorrhoidal veſſels: ſo that, of conſequence, melancholy may be produced by the hypochondriacal diſorder; by acute diſeaſes ill cured, and eſpecially a phrenitis and burning fever; by an exceſs of all the ſecretions and excretions; by ſuch aliments and drinks as are cold, tenacious, terreſtrial, tart, and aſtringent; by violent heat long protracted and parching the blood; as alſo by a ſtagnant, moiſt, and cloudy air.

3. A naturally black, hairy, dry, ſlender, and robuſt conſtitution of body, a middle age, a quick, penetrating, and diſcerning genius.

If this diſorder continues long, it produces ſtupidity, epilepſies, apoplexies, madneſs, convulſions, blindneſs, ſurpriſing fancies, laughter, weeping, ſinging, ſighs, eructations, flatulencies, anxieties; an urine ſometimes copious and limpid like water, and at others highly thick; a retention, accumulation of the excrementitious blood in the veſſels of the abdominal viſcera, and often a ſudden excretion of it; obſtinate coſtiveneſs, frequent ſpitting of a thin matter, and an incredible ability of enduring watchings, hunger, and cold.

This diſorder has often been cured by a ſupervening unſeemly itch, ſometimes reſembling an elephantiaſis; by numerous and large varices; by a copious diſcharge from the turgid hæmorrhoidal veins; and an evacuation of the black bile by vomit and ſtool.

Patients labouring under this diſorder are generally injured by all medicines which impair the ſtrength, and evacuate too forcibly; as alſo by thoſe which

which throw the humours into too violent commotions, whether cordials, or medicines of whatever denomination.

Hence the beſt method of curing this diſorder is, after a due obſervation of the firſt cauſes and the variety of patients conſtitutions, to accommodate various medicines to theſe cauſes, and various conſtitutions.

The ſeveral intentions of cure to be purſued, therefore, are, 1. To rouſe, augment, and regulate the fluids of the brain and nerves; which is done, firſt, by diverting the mind from its uſual object to others of an oppoſite nature: ſecondly, by inducing cautiouſly another diſpoſition, or affection of mind, oppoſite to melancholy: thirdly, by humouring the perverſe and falſe turn of the imagination: or, fourthly, by frequently oppoſing it with great vigour.

2. To remove thoſe obſtructions which are either the cauſe, or the effect, of a perverted imagination, by ſoftening, inciding, and ſtimulating the obſtructing matter, by means of mineral waters, whey, viſceral, hepatic, and antihypochondriac decoctions, waters invigorated with lixivial or compound ſalts, laxitive preparations of mercury, emetics, motion, exerciſe, riding, ſailing, uterine medicines, and ſuch as promote the lochia, remedies which procure hæmorrhoidal diſcharges, baths, liniments, and plaſters.

3. To alleviate the ſymptoms by veneſection, immerſion in cold waters, and the uſe of carminatives and opiates.

4. After due evacuations, to exhibit ſuch things as are from experience known to exhilarate the mind, and corroborate all the parts of the body.

From what has been ſaid, it is obvious that the perfect cure of this diſorder, as well as of a great many others falſly accounted incurable, conſiſts in the correction of the bilis atra, or melancholic humour.

When melancholy increaſes ſo far as to bring on an agitation of the fluids of the brain, capable of driving the patient into a raging fury, the diſorder is called madneſs.

This only differs in degree from a dejected melancholy, is its offspring, ariſes from the ſame cauſes, and is generally to be cured by the ſame medicines.

In madneſs the muſcles are generally ſurpriſingly ſtrong, the patient is afflicted with watchings, incredibly capable of enduring hunger and cold, diſtracted by terrible imaginations, and ſubject to thoſe diſorders called lycanthropia and cynanthropia; which ſee.

It is obſervable, that, upon diſſecting thoſe who have died of madneſs, the brain has been found dry, hard, and friable, with its cortical ſubſtance of a yellow colour, and its veſſels turgid, varicoſe, and diſtended with black and viſcid blood.

It is alſo obſervable, that, during this diſorder, all the excretions have, in like manner, almoſt ceaſed.

Unexpected precipitation into the ſea, and a ſubmerſion in it, continued as long as poſſible, conſtitute the principal remedy for it.

Madneſſes, obſtinate againſt all remedies, have often been removed upon the approach of varices, hæmorrhoidal diſcharges, dyſenteries, dropſies, copious ſpontaneous hæmorrhages, tertian and quartan fevers.

Such a ſort of madneſs ſometimes ariſes after the body is, by an autumnal, violent, and long-continued intermittent fever, weakened and exhauſted, both by the force of the diſeaſe, and repeated veneſections and purgings. The madneſs is alſo generally brought on again by theſe very means.

This ſpecies of the diſorder is only to be cured by the uſe of reſtoratives, cardiacs, and corroboratives, long perſiſted in; but, if it is treated with evacuation, it brings on an atrophy, a weakneſs, and an unſurmountable fooliſhneſs.

But a madneſs ariſing in robuſt vigorous perſons, in the flower of their age, or of hot and plethoric habits, is to be cured by repeated veneſections, interpoſing a briſk purge between each; and when the diſorder is alleviated, it is to be treated with opiates and cardiacs. *Boerhaave's Aphoriſms.*

MELANE, among phyſicians. See the article ALPHOS.

MELANTERIA, in natural hiſtory, a very beautiful foſſil, of a denſe, compact, and regular texture, and of an extremely bright pale yellow, reſembling nothing ſo much as the pureſt gold: it is remarkably heavy, and is uſually found in little irregular maſſes, of the bigneſs of a pigeon's egg, which are broken with a ſlight blow; but it is uſually met with in the form of a fine gold-coloured efflorescence or vitriolic and pyritical bodies; or in looſe, ſhattery, and friable maſſes, of a more duſky yellow, in which latter ſtate, it ſo much reſembles a native ſulphur, that it is frequently miſtaken for one: however, it is not inflammable, but calcines in the fire to a greyiſh powder, which by burning longer, changes to a deep and fine purple.

MELANTHIUM, in botany, a genus of plants whoſe flower conſiſts of ſix ovato-oblong, patent petals, with ſix erect ſlender filaments, topped with globoſe antheræ: the fruit is an ovate trigonal capſule, with three cells, which contain a number of compreſſed ſemi-ovate ſeeds.

MELAPODIUM, in botany, a genus of plants whoſe flower is compound and radiated; the particular hermaphrodite corollulæ are ſituated in the diſk, and the female ones form the rays: the ſtamina are five very ſmall filaments, topped with tubuloſe cylindraceous antheræ: the ſeeds are oval, compreſſed, three-cornered, and placed on a conic paleaceous receptacle.

MELASSES, or MOLASSES. See the article MOLASSES.

MELASTOMA, in botany, a genus of plants, the flower of which conſiſts of five roundiſh petals, with ten ſhort filaments inſerted in a ventricoſe cup; theſe are terminated by long erect antheræ, a little curved: the fruit is a roundiſh quinquelocular berry, containing many ſmall ſeeds.

MELCHITES, in church hiſtory, the name given to the Syriac, Egyptian, and other Chriſtians of the Levant. The Melchites, excepting ſome few points of little or no importance, which relate only to ceremonies and eccleſiaſtical diſcipline, are in every reſpect profeſſed Greeks; but they are governed by a particular patriarch, who reſides at Damas, and aſſumes the title of Patriarch of Antioch.

MELCHIZEDECHIANS, in church hiſtory, a ſect which aroſe about the beginning of the third century, and affirmed, that Melchizedech was not a man, but a heavenly power, ſuperior to Jeſus Chriſt; for Melchizedech, they ſaid, was the interceſſor and mediator of the angels, but Jeſus Chriſt was ſo only for men, and his prieſthood only a copy of that of Melchizedech. This hereſy was revived in Egypt by one Hierax, who pretended that Melchizedech was the Holy Ghoſt.

MELEAGRIS, the turkey, in ornithology. See TURKEY.

MELES, the badger, in zoology. See the article BADGER.

MELIA, the bead-tree, in botany, a genus of plants, whoſe flower conſiſts of a ſmall monophyllous cup, cut into five obtuſe ſegments at the top, with five narrow lanceolated petals which ſpread open, and a cylindraceous nectarium: the ſtamina are ten ſmall filaments, inſerted in the top of the nectarium, terminated by oblong antheræ: the fruit is a ſoft globular drupe, containing a roundiſh nut, having five furrows and five cells, each containing an oblong ſeed.

MELIANTHUS, honey-flower, in botany, a genus of plants whoſe flower is compoſed of four lanceolated petals, which are reflexed at their points: the fruit is a quadrangular capſule, containing four globoſe ſeeds.

MELICA, in botany, a genus of plants, whoſe flower is compoſed of two valves, not ariſtated: it hath no pericarpium; but the ſeed, which is ſingle and ovate, is included in the corolla.

MELICERES, in ſurgery, a kind of encyſted tumours, ſo called when their contents are of the conſiſtence of honey; but when this is of the conſiſtence of paſte, they are called a theromata.

MELILOT, in botany, a ſpecies of trifolium: it grows naturally in ſeveral parts of England: the flowers are produced in long ſlender ſpikes, which come out from the wings of the ſtalks; they are papilionaceous, and of a bright yellow colour.

In pharmacy, melilot is ſcarce ever given internally; but in external uſe, it is a great emollient, reſolvent, and digeſtive: it is a good ingredient in cataplaſms and fomentations, and alſo in clyſters. The flowers are recommended by ſome, in infuſion, as a remedy againſt the fluor albus.

MELISSA, baum, in botany. See the article BAUM.

MELITTIS, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the upper lip is plane, erect, and roundiſh, and the lower one is trifid and obtuſe: the ſeeds, which are four in number, are placed in the bottom of the cup.

MELOCHIE, in botany, a genus of plants, whoſe flower conſiſts of five large, cordated, ſpreading petals: the fruit is a roundiſh capſule, having five cells, each containing a ſingle ſeed.

MELODY, in muſic, the agreeable effect of different ſounds, ranged and diſpoſed in ſucceſſion; ſo that melody is the effect of a ſingle voice or inſtrument, by which it is diſtinguiſhed from harmony. See HARMONY.

MELON, in botany, makes a diſtinct genus of plants, the flowers of which conſiſt only of one leaf each, and are wide at the mouth, and divided into ſeveral ſegments, wholly reſembling the flowers of cucumbers: of theſe alſo, ſome are male or ſterile flowers, having no embryo fruit; others are fruitful or female flowers, having an embryo, which ripens into a large fruit of an oval figure, ſometimes ſmooth, ſometimes rough, divided into three cells, and containing oblong ſeeds; each of theſe cells ſeems alſo to be divided into two.

There are great varieties of melons, but the beſt ſorts we know of are the Romana and Cantaleupe melons, ſo called from the places where they have been firſt propagated in Europe, though they originally came from ſome parts of Aſia. They are raiſed on hot-beds, nearly in the ſame manner as thoſe of cucumbers; but the earth in which they grow, ſhould be much ſtronger, and not more than two plants to one light; theſe, as they advance in growth, ſhould be trained thin and regularly, ſo as to prevent confuſion among the branches, being previouſly pinched off at the ſecond joint, which produces lateral ſhoots, whoſe extremities ſhould alſo be pinched off when they have five or ſix joints; this will occaſion freſh branches to iſſue forth, which produce the fruit; theſe branches ſhould likewiſe be pinched off at the joint beyond the fruit, which will help to ſet them, they being very liable, in bad weather, to turn yellow and come to nought; therefore, they are not ſet with certainty till they are arrived to the ſize of a hen's egg. Some, to ſet the fruit, uſe the method of taking the male flower, and ſtriking its farina into the eye of the female flower, in order to impregnate the fruit, which is very proper, particularly to thoſe early-raiſed plants, that

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can admit of but a ſmall ſhare of air being given them on account of its coldneſs. (See the article *Generation of* PLANTS). The fruit, when fully grown, ſhould be often noticed for their being cut at a proper time, which is known by the ſtalk cracking round the part which join to the fruit, as likewiſe by the ſmell; but for thoſe kinds of Cantaleupe melons whoſe rinds are thick, it is neceſſary to let them be on the branch a day longer than the other ſorts after they have ſhewn the marks of ripeneſs; and if they are cut early in the morning, before the ſun has warmed them, they will be much higher flavoured.

It may be neceſſary to obſerve, that the larger the glaſſes are, the better it will be for the plants, and the greater number of fruit will be obtained, which will alſo be larger and richer flavoured than thoſe raiſed in the contracted glaſſes commonly uſed, which are not above four feet and a half in depth, which greatly prevents the plants from extending themſelves, and makes it neceſſary either to pinch them too cloſe, to keep them within the frame, or elſe the box muſt be raiſed to let them out underneath when the ſeaſon will not admit of it, but this is to be underſtood of thoſe which are raiſed in February or March; about ſix feet is a very good width for a melon-frame.

The firſt ſeaſon for ſowing melon-ſeeds is in January, and the laſt the latter end of April or beginning of May.

The ſeeds of melons are reckoned among the greater cold ſeeds; they are eſteemed cooling and diuretic; they ſerve to make emulſions, but at preſent they are not ſo much noticed as formerly.

MELONGENA, mad-apple, in botany, a genus of plants, whoſe flower is monopetalous, with a ſhort tube, and the limb cut into five ſegments, which are plicated and reflexed; the ſtamina are five ſmall ſubulated filaments, terminated by oblong connivent antheræ. The fruit is a ſmooth, egg-ſhaped berry, with a fleſhy pulp, having one cell, which contains a number of roundiſh compreſſed ſeeds.

A ſpecies whoſe fruit is white and much reſembling an egg, is raiſed with us in the ſpring, on a common hot-bed, from ſeed, and afterwards tranſplanted in borders or pots as other annual plants are; theſe are preſerved merely for the ſhew of the fruit; but in the warm parts of the globe they are eaten as a delicacy, which not in the leaſt ſuits an Engliſh palate.

MELON-THISTLE, *Cactus*, in botany, a genus of plants ſhaped like a melon, with deep ribs beſet with ſtrong ſpines, and of a green colour; ſome of which are crowned with a prickly brown cap, which gives them a ſingular appearance. The flower is hexapetalous, and ſpreads open at the top, and the fruit is a fleſhy berry with one cell, containing a number of angular ſeeds. Theſe plants are natives of the warmeſt parts of America, growing in the apertures of the rocks, having little or no earth to ſupport them; therefore we are directed that thoſe which are kept here ſhould not have a rich ſoil for their ſupport; the moſt proper for theſe plants is the rubbiſh of old buildings: they require to be kept in a hot-houſe conſtantly, and in winter ſhould have ſcarce any water given them. To this genus Linnæus has joined the cereus and opuntia of other authors.

MEMBRANE, in anatomy, a pliable texture of fibres, interwoven together in the ſame plane.

The membranes differ in thickneſs, according to the ſmallneſs of their fibres, or the number of their planes. Theſe particular planes are termed laminæ, and are diſtinguiſhed into internal, external, and middle. The difference of membranes, in general, depends on that of the fibres of which they are compoſed. Small portions of membranes, eſpecially when they are very thin, are called pellicles, and called the cellular or ſpongy ſubſtance.

MEMBRANOSUS, in anatomy, a muſcle otherwiſe called faſcia lata.

MEMOIRS, in matters of literature, a ſpecies of hiſtory, written by perſons who had ſome ſhare in the tranſactions they relate, anſwering to what the Romans call *commentarii*, commentaries.

MEMORY, *Memoria*, a faculty of the human mind, whereby it retains or keeps the ideas it has once perceived. See IDEA.

Memory (ſays Mr. Locke) is, as it were, the ſtore-houſe of our ideas; for the narrow mind of man not being capable of having many ideas under view at once, it was neceſſary to have a repoſitory, in which to lay up thoſe ideas which it may afterwards have uſe of. But our ideas being nothing but actual perceptions in the mind, which ceaſe to be any thing where there is no perception of them; this laying up of our ideas in the repoſitory of the memory, ſignifies no more than this, that the mind has a power, in many caſes, to revive perceptions it has once had, with this additional perception annexed to them, that it has had them before. And it is by the aſſiſtance of this faculty, that we are ſaid to have all thoſe ideas in our underſtandings which we can bring in ſight, and make the ſubjects of our thoughts, without the help of thoſe ſenſible qualities which firſt imprinted them there.

Attention and repetition help much to the fixing ideas in our memories: but thoſe which make the deepeſt and moſt laſting impreſſions, are thoſe which are accompanied with pleaſure and pain. Ideas but once taken in, and never again repeated, are ſoon loſt; as thoſe of colours, in ſuch as loſt their ſight when very young.

The memory of ſome men is tenacious even to a miracle: but yet there ſeems to be a conſtant de-

cay of all our ideas, even of thoſe which are ſtruck deepeſt, and in minds the moſt retentive: ſo that, if they be not ſometimes renewed, the print wears out, and at laſt there remains nothing to be ſeen.

Thoſe ideas that are often refreſhed, by a frequent return of the objects or actions that produce them, fix themſelves beſt in the memory, and remain longeſt there: ſuch are the original qualities of bodies, viz. ſolidity, extenſion, figure, motion, &c. and thoſe that almoſt conſtantly affect us, as heat and cold.

In memory, the mind is often more than barely paſſive; for it often ſets itſelf on work to ſearch ſome hidden ideas; ſometimes they ſtart of their own accord; and ſometimes tempeſtuous paſſions tumble them out of their cells. This faculty, other animals ſeem to have to a great degree, as well as men, as appears by birds learning tunes, and their endeavour to hit the notes right. For it ſeems impoſſible that they ſhould endeavour to conform their voices, as it is plain they do, to notes whereof they have no idea.

Local MEMORY, among orators, is nothing but the aſſociating the different heads to be handled, with the objects before the ſpeaker's eyes; ſo that, by only looking around him, he is put in mind of what he is to ſay.

Artificial MEMORY, *Memoria Technica*, a method of aſſiſting the memory, by forming certain words, the letters of which ſhall ſignify the date or æra to be remembered.

MENDICANTS, or begging friars, ſeveral orders of religious in Popiſh countries, who having no ſettled revenues, are ſupported by the charitable contributions they receive from others.

MENIALS, in law books, domeſtic or houſhold ſervants, who live under their lord or maſter's roof.

MENINGES, or MENYNGES, in anatomy, a name given to the dura and pia mater of the brain.

MENIPPEAN, in poetry, a kind of ſatire, conſiſting of proſe and verſe intermixed.

MENISCUS, in optics, a lens, convex on one ſide and concave on the other. See LENS.

For finding the focus of a meniſcus, the rule is, as the difference of the ſemi-diameters of the concavity and convexity, to the ſemi-diameter of the concavity; ſo is the diameter of the convexity to the focal diſtance.

MENNONITES, a ſect of baptiſts in Holland, ſo called from Mennon Simonis of Friezeland, who lived in the ſixteenth century.

This ſect believe, that the New-Teſtament is the only rule of faith; that the terms Perſon and Trinity are not to be uſed in ſpeaking of the Father, Son, and Holy Ghoſt; that the firſt man was not created perfect; that it is unlawful to ſwear or to wage war upon any occaſion; that infants are not the proper ſubjects of baptiſm; and, that miniſters of the Goſpel ought to receive no ſalary.

MENOLOGY, the Greek calendar, in which the lives of the ſaints in ſhort, or barely their names, are cited; anſwering nearly to the martyrology of the Latin church.

MENSALS, *Menſalia*, in church hiſtory, ſuch livings as were formerly united to the tables of religious houſes, and hence called menſal benefices.

MENSES, *Catamenia*, fluors, courſes, in medicine, are the monthly evacuations from the uterus of women not with child, and not giving ſuck.

The word is derived from the Latin *menſis*, a month, the period wherein they generally return.

The common cauſe of the ſtoppage of the menſtrual diſcharges is the blood's lentor; whereby this fluid becomes incapable of forcing the ſphincters of the ducts deſtined by nature for this evacuation. For it is not from the burſted arteries of the uterus, which is the common opinion, that the blood iſſues every month, but from veſſels peculiarly appropriated to this office. And this lentor, or thickneſs of the blood, changes the lively colour of the face into a greeniſh, pale, and wan complexion.

The proper medicines, in this diſtemper, are thoſe which are capable of increaſing the blood's circulation, and attenuating the viſcid humours: and ſuch are all bitters, joined with aromatics; as alſo many preparations of ſteel. But to theſe ought to be premiſed blood-letting, and cathartics blended with calomel. The tinctura ſacra is alſo an excellent medicine.

But of all the moſt powerful emmenagoges, I have found ſo ſingular virtue in black hellebore, that I hardly remember it ever failed anſwering my expectation. My way of ordering it is, a tea-ſpoonful of tincture of black hellebore in a glaſs of warm water, to be taken twice a day. And I have obſerved this remarkable circumſtance, that whenever, either from a bad conformation of the parts, or any other cauſe, this medicine had not the deſired effect, the blood was forced through ſome other paſſages; which is a manifeſt proof of the great power of this medicine in ſpurring the blood forward.

But likewiſe the menſtrual diſcharges frequently run to exceſs. In that caſe, the flux is to be reſtrained; which, after letting blood, is effected, both by thoſe medicines which condenſe and inſpiſſate the blood and by thoſe which allay its heat. Of the firſt ſort, the principal are ſuch as participate of vitriol or alum; eſpecially the tincture of roſes; or a powder compoſed of alum three parts, and dragon's-blood one part, melted together. But the heat of the blood, and its conſequence, the flux, is more powerfully checked by the Peruvian bark, than by any other medicine whatſoever. *Mead.*

MENSTRUUM, or DISSOLVENT, in chemiſtry, a body which, when artificially applied to another, divides its ſubtility, ſo that the particles of the ſolvent remain thoroughly intermixed with thoſe of the ſolved.

It was called a menſtruum, becauſe the chemiſts, in its application to the ſolvend, firſt uſed a moderate fire, for a philoſophical month, or forty days; and hence aroſe the name of menſtrual ſolvent, at length barely a menſtruum.

It is the property of a menſtruum to be itſelf equally diſſolved, when it diſſolves the ſolvend; but when the ſolution is perfected, it may ſometimes happen that the ſolvent and ſolvend ſhall ſeparate. The divided parts, therefore, of a ſolvent, muſt inſinuate itſelf among the parts of the ſolvend, ſo as to divide and diſſolve the body. Hence it appears, that the actions of menſtruums differ from all mechanical ſeparations, where the inſtrument, ſuch as a knife, ſword, or ſaw, while it divides, is not itſelf divided, but remains almoſt entire. But there is ſome reaſon to ſuſpect, that the ſingle particles of a menſtruum act like mechanical inſtruments, by the properties of their own proper ſize, figure, hardneſs, and gravity. Every menſtruum, while it diſſolves, is neceſſarily divided into inviſible particles, and muſt therefore be fluid in the action; and when the diſſolution is completed, the ſolvent and ſolvend muſt become one fluid.

Cuſtom has given the name of menſtruums to many bodies of a hard and conſiſtent nature, though in that ſtate they cannot act as ſolvents; and hence the chemiſts have divided menſtruums into ſolid and fluid.

Dry or ſolid menſtruums may be again divided into five claſſes, which, according to Boerhaave, are as follow: 1. The ſix metals, gold, lead, ſilver, copper, iron, and tin, which act upon one another after being fuſed in the fire, and may be intimately mixed, ſo as to make an apparently homogeneous maſs, every particle of which holds the ſame proportion of a different metal as the whole: for if ten ounces of ſilver be thus mixed with an ounce of gold, and a grain of this maſs be given to an aſſay-maſter, he will diſcover that it contains one eleventh part gold, and ten parts ſilver. 2. The ſemi-metals, as antimony, biſmuth, cinnabar, marcaſites, and zinc, which, when melted, mix with one another or with metals; but when thus mixed they are no longer malleable, but may eaſily be reduced to powder. 3. The dry ſalts, as alum, borax, nitre, ſal-ammoniac, ſea-ſalt, vitriol, fixed alkali, and murcury ſublimate, which may be ſubtilly divided by fire, and intimately mix with one another, with metals, ſemi-metals, and other things. 4. Hard foſſile ſulphureous bodies, as ſulphur vivum, common brimſtone, arſenic, orpiment and cobalt. 5. The foſſile bodies, called by refiners cements, which conſiſt of ſalts, ſulphur, and brick, reduced to dry powders, and ſtrewed betwixt plates of metals, in order to raiſe their colour, or ſeparate one metal from another.

Some menſtruums being left to themſelves, after olution concrete into a hard maſs, which, though compounded, appears of an uniform ſimple nature. In this manner, if melted lead be mixed with tin, they unite, as water with water, or mercury with mercury. The caſe is the ſame in all the metals, and in ſome of the ſemi-metals. Thus if a ſcruple of regulus of antimony be added to a pound of melted tin, the maſs when cold will appear uniform, but become entirely brittle; ſo fixed alkali unites with ſand in the fire; and ſulphur and mercury, by being ground together, turn to a black and dry powder, which being ſublimed, produces an apparent ſimple body, called cinnabar. Many become an hard, and ſometimes a dry body. Thus almoſt all the menſtruums of metals unite with their reſpective metals into ſolid vitriols; and thus ſtrong diſtilled vinegar, when it has diſſolved ſhells, chalk, and ſtony ſubſtances, ſeparates from its water, and together with the body it diſſolves, forms a dry hard maſs.

Numerous menſtruums have a liquid form before they act as ſolvents; as vinegar, water, ſaline, acid, alkaline, and compounded ſpirits, alkaline oils per deliquium, &c. Some menſtruums become liquid after the ſolution, and continue ſo with the ſolvent. Thus in the diſſolution of five of the metals with ſimple mercury, a ſoft paſte is produced, which may indefinitely be diluted by the addition of more mercury; but there is ſcarcely any known method of reſtoring this amalgama to its ſolidity. All the liquid menſtruums, after having diſſolved metals in a large proportion, cannot eaſily be dried; whence many have imagined theſe ſolutions to be fixed metallic oils, and have in vain ſought ſecrets in them.

It is now eaſy to obſerve that many menſtruums unite bodies as well as ſeparate them; for frequently after the diſſolution, the particles of the menſtruum preſently join with thoſe of the ſolvent, and produce a new compound, often very different from the nature of the ſimple reſolved body. The parts however of the ſolvent, after its concretion, no longer touch one another, but are ſeparated by the interpoſition of the particles of the matter diſſolved; and the particles which before conſtituted the ſolvend, are ſeparated by the interpoſition of the particles of the ſolvend. Hence it is plain that the parts of the menſtruums apply themſelves to the parts of the ſolvend; and a certain cauſe is here required to make the particles of the ſolvent fly from one another and approach the particles of the ſolvend, rather than remain in their former ſituation. The like cauſe ſeems to be required to make the particles of the ſolvend, now ſeparated, remain united with the parts of the menſtruum, rather than ſuffer the diſſolving and diſſolved particles to unite by their natural affinity into homogeneous bodies. This cauſe muſt be ſought in the ſolvend as well as in the ſolvent, for the action is reciprocal. Thus while aqua regia diſſolves thrice its weight of gold into a yellow

yellow liquor, the particles of gold are united with the aqua regia, and remain ſuſpended in it, though gold be eighteen times heavier than aqua regia. Whence there muſt be a mutual correſponding power between the particles of the gold and aqua regia, whereby they act upon, embrace and detain each other, otherwiſe the particles of gold would fall to the bottom, the ſaline particles reſt upon them, and the water float over both. If we were to deduce the cauſe from ſimilitude of ſubſtance, the action of diſſolution ſeems to be performed by a certain power of the parts of the menſtruum to attract the diſſolved parts rather than to repel them; and is not a mechanical action, or unfriendly commotion, but rather an appetite of union. Thus, in a violent ſolution, the agitation, heat, hiſſing and tumult ceaſe when all the parts of the ſolvend have united with thoſe of the ſolvent, as appears in throwing a piece of iron into weak aqua-fortis.

The whole ſolvent never acts at once upon the whole ſolvend, only thoſe particles of the ſolvent which touch ſome others of the ſolvend act firſt; and theſe being ſeparated, freſh particles of the menſtruum apply themſelves to others of the ſolvend: therefore part of the menſtruum acts upon that part of the body which it ſtrikes off and ſeparates; but the conflict made in this ſeparation excites a greater motion in the menſtruum, by which means other parts of the menſtruums are agitated and applied to other parts of the ſolvend.

Fire excites, promotes, and increaſes the action of menſtruums; for in extreme cold, ſolutions are either not made, or made but ſlowly, but they are ſoon performed by the aſſiſtance of heat: ſome menſtruums require a ſtrong heat, as mercury, before it will diſſolve metals: ſome a ſmaller; thus ſal ammoniac, ſea ſalt, and ſalt of tartar, eaſily diſſolve in water; ſome menſtruums act with a moderate heat, but loſe their diſſolving power, or even acquire a power of coagulating, by a ſtronger; thus warm water diſſolves the whites of eggs, which boiling coagulates. This effect of fire ſeems to be produced, 1. By impelling, moving, and agitating the menſtruum in the manner of a mere mechanical motion. 2. By its general power of expanding the ſubſtance of all bodies. 3. By ſeparating the parts ſo as ſet them farther aſunder. In moſt caſes the heat is increaſed during the ſolution, and even the action of thoſe menſtruums is augmented by heat, which degenerate a great degree of cold in the ſolution; thus ſal ammoniac diſſolves ſooneſt in warm water.

Sir Iſaac Newton accounts for the action of menſtruums, from the acids wherewith they are impregnated, which are found to be endued with a ſtrong attractive force, wherein their activity conſiſts. See ACID.

MENSTRUUM, in pharmacy, chiefly denotes a body that will extract the virtues of ingredients by fuſion, decoction, &c.

MENSTRUUM *Peracutum*, a menſtruum which Mr. Boyle extracted from bread only, that would prey even on glaſs, and perform many things which aqua-fortis would not.

With this he drew tinctures from coral, lapis hæmatites, granates, diamonds, and rubies.

Univerſal MENSTRUUM. See ALKAHEST.

MENSURATION, *Menſuratio*, in general, denotes the act or art of meaſuring lines, ſuperficies, or ſolids.

MENTHA, mint, in botany. See the article MINT.

MENTZELIA, in botany, a genus of plants, whoſe flower conſiſts of five patent petals, with many ſetaceous erect ſtamina: the fruit is a long cylindraceous capſule, with one cell, containing many ſmall ſeeds.

MERCATOR's CHART, a projection of the earth's ſuperficies in plano, where the meridians are ſtraight lines, parallel to, and equidiſtant from, each other. The parallels of latitude are alſo ſtraight lines, and parallel to one another, but the diſtance between them increaſes from the equinoctial towards either pole, in the ratio of the ſecant of the latitude to the radius. See *Mercator's* SAILING.

MERCHANT, a perſon who buys and ſells commodities in groſs, or deals in exchanges; or that traffics in the way of commerce, either by importation or exportation. Formerly, every one that was a buyer or ſeller in the retail way, was called a merchant, as they ſtill are both in France and Holland; but here, ſhop-keepers, or thoſe who attend fairs or markets, have loſt that appellation.

MERCURIAL, ſomething conſiſting of, or relating to, mercury.

MERCURIFICATION, in chemiſtry, the method of ſeparating the mercuries of metals, which is moſt eaſily effected by means of a burning-glaſs; for the metal being placed in its focus, its mercurial parts are ſaid to fly off in ſmoke, which when condenſed and collected, appears to be true quickſilver.

MERCURY, in natural hiſtory, a fluid metallic ſubſtance, not moiſtening the hands; perfectly opake; of a bright ſilver colour, reſembling lead or tin when melted; entirely void of taſte and ſmell; extremely diviſible; not congealable in the greateſt degree of natural cold.

It is the moſt ponderous of all fluids, and of all known bodies except gold and platina; its gravity is to that of water nearly as 14 to 1; a cubic foot of quickſilver weighing 947 pounds, whilſt a cubic foot of water weighs but 70: it is found to be heavier in winter than in ſummer, in the proportion of eleven ounces thirty-two grains, to eleven ounces ſeven grains. In conſequence of its great denſity, it is of all fluids the coldeſt to the touch: the hand

cannot

cannot be kept one quarter of an hour in a quantity of quickſilver with ſafety. Of all fluids likewiſe it grows the hotteſt, not really, but apparently, from the application of an equal external heat.

In a heat below ignition, it totally exhales in extremely thin, ſubtile, penetrating fumes, which condenſe into running mercury again: the admiſſion of air, which changes the fumes of the other ſemimetals into a powdery calx, has not that effect upon thoſe of quickſilver.

It diſſolves in all the mineral acids, but with different degrees of facility; and proves itſelf a menſtruum for ſundry metallic bodies. It has the greateſt affinity with gold; adhering to, and diſſolving that metal the moſt readily of all. It unites eaſily alſo with ſilver; leſs eaſily with lead; ſtill leſs ſo with tin; very difficultly with copper; moſt difficultly of all with iron, to which it ſeems to have an inſuperable repugnance. It does not eaſily take up biſmuth or regulus of antimony, unleſs they are previouſly mingled with other metals, or diſpoſed to unite with it by particular managements; after it has been combined with either of theſe, it throws them out again upon digeſtion; biſmuth, nevertheleſs, diſpoſes ſome other metals, particularly lead, to ſuch an intimate union with mercury, as to paſs along with it through the pores of leather. Quickſilver mingles alſo with various ſaline ſubſtances, and with ſulphur; with which laſt it forms a black maſs called æthiops, which changes, on ſublimation, into a red one called cinnabar.

There are different methods of purifying quickſilver; as ſtraining through leather; trituration or ablution with vinegar; with vinegar and ſalt, with ſope-leys, with rectified ſpirit of wine, and with aqua-fortis; and diſtillation, either without addition, or with alkaline ſalts, quick-lime, or iron filings. When quickſilver is only ſuperficially mixed with duſt or earthy powders, ſtraining thro' leather is ſufficient for its purification: if any foulneſs ſtill remains, ſpirit of wine will waſh it off: unctuous or oily impurities require ablution with ſope-leys. Lead and biſmuth are moſt effectually ſeparated by making the mercury into an æthiops, with a ſufficient quantity of ſulphur, and reviving it again from the æthiops by diſtillation, with twice its quantity of quick-lime, alkaline ſalt, or iron filings; the mercury alone will diſtil, and leave all its impurities behind; ſulphureous, antimonial, and other like admixtures, are to be ſeparated by the ſame means. The purification by aqua-fortis is performed by taking only a ſmall quantity of the acid to a large one of mercury; grinding them diligently together, and then waſhing the quickſilver with water. When mercury is combined with ſulphur into cinnabar, the revivification of it does not well ſucceed with alkaline ſalts; by fixed alkalies, the ſulphur is very difficultly, and not perfectly abſorbed; to volatile alkalies it does not yield at all: on the other hand it is obſervable, that metallic bodies, as iron, lead, tin, regulus of antimony, readily detain the ſulphur in diſtillation, and ſuffer the mercury to ariſe pure.

The largeſt quantities of mercury are employed for metallurgical operations: gold and ſilver are extracted, in the Spaniſh Weſt-Indies, from their ores or matrices, by amalgamation with mercury; and both metals are recovered by the ſame means, when blended in minute particles with earthy matters, as filing or working them. Amalgamated with tin, it makes the foil for looking-glaſſes, and reflecting balls. It is uſed alſo for gilding on ſilver, for anatomical injections, for weather-glaſſes, and ſundry other purpoſes. In vacuo, it appears luminous, and is then called the mercurial phoſphorus.

Quickſilver, conſidered as a medicine, is a ſpecific againſt the venereal diſeaſe, worms, lice, and all kinds of inſects: the venereal diſtemper is not perhaps to be radically cured without it; but againſt inſects there are other remedies equally if not more effectual. It is commonly ſuppoſed to have, of itſelf, no poiſonous quality; but it appears by experience, manifeſtly prejudicial to the nerves and the bones. Its ill effects are moſt obſervable in thoſe who are expoſed to its fumes; which fumes are no other than perfect quickſilver, as any one may be convinced by receiving them on a piece of moiſt leather or cloth, upon which they will reunite into little globules of mercury. Moſt people admit a pernicious quality in the fumes, though they deny it to the quickſilver; not conſidering that the fumes are only the quickſilver itſelf, divided but not altered by the heat. Even mercurial ointments applied externally have occaſioned contractions of the limbs, corroſions of the bones, and other dangerous conſequences. How ſoon do the miners feel its effects, though they neither anoint with it, nor ſwallow it, nor are expoſed to the fumes into which it is reſolved by fire! They firſt become paralytic, and fall afterwards into a ſalivation: their teeth drop out: violent pains in the whole body, particularly in the bones, and at length death, ſucceed. It may be proper to obſerve, that the Spaniſh phyſicians treat theſe patients in a different method from that purſued among us and in other countries: they expoſe them frequently for a conſiderable length of time to the open air, and give internally nothing but abſorbents.

Quickſilver, included in a flat-bottomed glaſs, having a ſmall hole open to the air, and kept for ſeveral months in a conſtant heat juſt not ſtrong enough to make it evaporate, calcines by degrees into a red powder, called mercurius calcinatus. A greater heat, ſufficient to make the mercury diſtil, does not only promote the calcination, but revives ſuch part as has been already calcined, into running mercury again. A weaker heat, as that of the human body, or even of boiling water, though con-

tinued for years, changes only a ſmall part of the mercury into a blackiſh powder: conſtant triture or agitation produces ſimilar effects to this low degree of heat, and in a much ſhorter time. If the free acceſs of air ſhould be found to influence the calcination of this, as it does that of the metallic bodies called imperfect, the tedious proceſs might be expedited, by uſing, for the veſſel, a glaſs tube, with both its ends bent upwards, and one of them conſiderably higher than the other; through which, a conſtant ſtream of freſh air would paſs over the ſurface of the ſmall thread of mercury at the bottom.

This red powder has by ſome been greatly eſteemed in venereal caſes, and ſuppoſed to be the moſt effectual and certain of the mercurials. It is accompanied with one conſiderable inconvenience, being greatly diſpoſed to irritate the firſt paſſages, and occaſion gripes; to prevent which, a ſmall quantity of opium, and ſome warm aromatic material, are commonly joined to it: the antivenereal pills of a late celebrated empyric are ſuppoſed to have been a compoſition of this kind. Even when thus corrected, however, it does not appear to have any advantage above the mercurials in common uſe and of eaſier preparation. The doſe is from half a grain to two grains: five or ſix grains are ſaid to vomit and purge violently.

The blackiſh powder, obtained by long agitation, is the baſis of an antivenerial medicine, which has lately come into great repute abroad; but which appears, from the accounts publiſhed of it in France, to be neither ſo ſafe, nor ſo effectual, as ſome of the common officinal mercurials.

If oil of vitriol be poured on half, or equal, its weight of quickſilver, and gradually heated till the liquor boils and diſtils; the more phlegmatic parts ariſe, while the ſtronger acid corrodes the mercury into a white cauſtic maſs. On the affuſion of warm water, the maſs falls into powder, and becomes immediately yellow; a part of it, ſatiated with acid, diſſolving in the water: the larger the quantity of acid made uſe of, and the leſs thoroughly the matter has been exſiccated or calcined, the more of it will diſſolve. The yellow powder, ground with freſh quantities of water till all the ſoluble part is extracted, becomes inſipid, and in this ſtate, commonly called turpeth or turbith mineral, it proves, though not corroſive, ſtrongly emetic; operating, in this intention, the moſt effectually of all the mercurials that can be given with ſafety. It is uſed chiefly in violent gonorrhœas, and other venereal caſes accompanied with a great flux of humours to the parts: it is ſaid likewiſe to have been employed with ſucceſs, in robuſt conſtitutions, againſt leprous diſorders, and obſtinate glandular obſtructions. The doſe, as an emetic, is from two grains to ſix or eight; though ſome conſtitutions, habituated to mercurials, can bear larger quantities. It may be given in ſmaller doſes, as half a grain or a grain, as an alterative, after the ſame manner as the red calx of mercury already mentioned: and even when intended as an evacuant, it may perhaps, as Malouin obſerves, be moſt adviſeable to give only a ſmall quantity at a time, as one grain, and repeat this doſe every hour till the vomiting ſucceeds.

On adding a ſolution of ſea-ſalt to a ſolution of mercury made in aqua-fortis, the nitrous acid quits the mercury, and unites with the alkaline baſis of the ſea-ſalt; and at the ſame time, the acid of the ſea-ſalt unites with the mercury, and forms with it a compound, difficultly, and only partially diſſoluble, of which therefore great part ſubſides, on ſtanding for ſome time, in form of a white powder. This powder, waſhed with freſh quantities of hot water, till the more ſoluble parts are extracted, becomes nearly inſipid. In this ſtate it is recommended by Boerhaave as one of the beſt of the mercurials, and ſaid, in doſes of three grains, to purge and vomit gently. It appears, however, too corroſive for internal uſe; being ſo much ſo, as to be employed by the farriers for the purpoſes of an eſcharotic. The preparation is likewiſe a very unfrugal one, a conſiderable part of the mercury remaining unprecipitated, and a conſiderable part of the precipitate being diſſolved and carried off in the ablution.

Spirit of ſal ammoniac, or other volatile alkalies, dropped into a filtered ſolution of ſublimate, abſorb a part of the acid; and the mercury, retaining ſo little as to be indiſſoluble, renders the liquor milky, and ſubſides on ſtanding, in form of a fine white powder, which, waſhed by repeated affuſions of hot water, becomes inſipid. Solutions of fixed alkaline ſalts, ſubſtituted to the volatile ſpirit, produce a yellow precipitation; but if an equal weight of crude ſal ammoniac be diſſolved along with the ſublimate, fixed alkalies, added to this ſolution, extricate the volatile alkali of the ſal ammoniac, and the precipitate proves the ſame as if the volatile alkali alone had been added in its pure ſtate. Theſe precipitates are uſed chiefly on account of the elegance of their colour, in unguents for cutaneous eruptions; one part of the mercurial precipitate, three of precipitate ſulphur, and eighteen of the ſimple ointment or pomatum, moiſtened with a little ſtrong alkaline ley, make the common mercurial application for theſe complaints. The precipitates have been given internally; but mercurius dulcis, which differs from them only in being more mild, and more equal and certain in its effects, is in this intention greatly to be preferred. It does not appear that a combination of mercury, with ſo ſmall a proportion of acid, that is, ſo mild and ſafe a mercurial, can be obtained by any kind of precipitation, as by the proceſs by which mercurius dulcis is prepared.

Mercurius dulcis is ſublimate made mild, by com-

bining with it ſo much freſh mercury, as is ſufficient to ſatiate the redundant acid. Four parts of powdered ſublimate are ground with three of quickſilver, an operation in which great caution is neceſſary, to avoid the lighter corroſive particles that fly off, till they are thoroughly incorporated; or, which is much more commodious, digeſted together in a gentle heat, by which the union will be performed as effectually. The mixture is then ſublimed in a glaſs matraſs or phial; the ſublimed maſs freed from the whitiſh acrid matter about the mouth of the veſſel, and from ſuch mercurial globules as may happen to appear diſtinct, then pulveriſed, and ſublimed again: in this manner the ſublimation is repeated ſix times, by which means the medicine becomes leſs liable to irritate the firſt paſſages, and run off by ſtool.

Mercurius dulcis ſeems to be the beſt and ſafeſt of the mercurial preparations that can be taken in a ſolid form. It may be given from fifteen to twenty-five grains; or, as an alterative, from one to two or three grains.

MERCURY, ☿, in aſtronomy, the ſmalleſt of the planets, and the neareſt the ſun. See the article COPERNICAN.

Its mean diſtance from the ſun is 387 of ſuch parts of which the earth is 1000, its excentricity is 80 of ſuch parts. The inclination of its orbit is 6° 54′; it performs its revolution round the ſun in 87 days, 23 hours, 16′; its greateſt elongation is about 22° 46′. The place in the ecliptic for the aſcending node is in 14° 42′ of taurus. Its diameter to that of the earth is as 3 to 4; and therefore the globe of mercury will be to that of the earth as 2 to 5.

Mercury, in the ſame manner as venus, always keeps himſelf in the neighbourhood of the ſun, and never recedes from him ſo far as venus does; he hides himſelf ſo much in the ſplendor of the ſun's rays, that he is but ſeldom ſeen by us on the earth: but ſince the invention of teleſcopes, he has been frequently obſerved when in conjunction with the ſun, and to paſs under his diſk like a black ſpot. The exceeding brightneſs by which mercury outſhines all the planets, does evidently prove him to be much nearer the ſun than any of the reſt; for the nearer any body is to the ſun, the greateſt illuſtration it receives from him. From all this, it is evident, that mercury does likewiſe go round the ſun in a leſſer orbit, included within the orbit of venus. See the article VENUS.

MERCURY, in heraldry, a term uſed, in blazoning by planets, for the purple colour, in the arms of ſovereign princes. See the article BLAZONING.

MERIDIAN, in aſtronomy, a great circle paſſing through the poles of the world, and both the zenith and nadir, croſſeth the equinoctial at right-angles, and divideth the ſphere into two hemiſpheres, the eaſtern and weſtern: it has its poles in the eaſt and weſt points of the horizon. It is called meridian, becauſe when the ſun cometh to the ſouth part of this circle, it is then mid-day; and then the ſun has his greateſt altitude for that day. Theſe meridians are various, and change according to the longitudes of places; ſo that they may be ſaid to be infinite in number, for all places from eaſt to weſt have their ſeveral meridians: but there is (or ſhould be) one fixed, which is called the firſt meridian. Ptolemy choſe to make that the firſt meridian which paſſes near the Fortunate iſlands, at about the diſtance of one degree from them; and reckons from thence to the eaſt through Africa and Aſia; chooſing to begin at a place inhabited, and which was then the bounds and limits of the known part of the earth to the weſt, and to end at the eaſtern ſhore of Scain in Aſia.

But our geographers and map-makers frequently aſſume the meridian of the place, or the capital of the country, for the firſt meridian; and thence reckon the longitudes of their places.

MERIDIAN *Line*, on a dial, is a right-line ariſing from the interſection of the meridian of the place, with the plane of the dial: this is the line of twelve o'clock, and from hence the diviſion of the hour-lines begins. See DIAL.

Magnetical MERIDIAN, is a great circle paſſing through the magnetical poles, to which the magnetic needle, or needle of the mariner's compaſs, conforms itſelf.

MERIDIAN *Altitude of the Sun or Stars*, is their altitude when in the meridian of the place where they are obſerved. Or it may be defined, an arch of the great circle perpendicular to the horizon, and comprehended between the horizon and the ſun or ſtar, then in the meridian of the place.

MERIDIONAL DISTANCE, in navigation, is the ſame with the departure, eaſting or weſting, or the difference of longitude between the meridian under which the ſhip now is, and any other meridian ſhe was before under.

MERIDIONAL *Parts*, *Miles*, or *Minutes*, in navigation, are the parts by which the meridians in Mr. Wright's Chart (commonly, though falſely, called Mercator's) do increaſe as the parallels of latitude decreaſe: and as the coſine of the latitude of any place, is equal to the radius or ſemi-diameter of that parallel; therefore, in the true ſea-chart, or nautical planiſphere, this radius being the radius of the equinoctial, or whole ſine of 90°, the meridional parts at each degree of latitude muſt increaſe, as the ſecants of the arch, contained between that latitude and the equinoctial, do decreaſe. The tables, therefore, of meridional parts, which we have in books of navigation, are made by a continual addition of ſecants; they are calculated in ſome books for every degree and minute of latitude; and they will ſerve either to make or graduate a Mercator's Chart, or to work the Mercator's Sailing.

MERLON, in fortification, is that part of a parapet

rapet which is terminated by two embraſſures of a battery. Its height and thickneſs is the ſame with that of the parapet; but its breadth is generally nine feet on the inſide, and ſix on the outſide. It ſerves to cover thoſe on the battery from the enemy; and is better when made of earth well beat and cloſe, than when built with ſtone; becauſe theſe fly about and wound thoſe they ſhould defend.

MERLUCIUS, in ichthyology, a fiſh called in Engliſh the hake. See HAKE.

MERMAID, or MERMAN, an imaginary animal, ſuppoſed to be half human and half fiſh; which probably took its riſe from an imperfect view of the thrichechus. See THRICHECHUS.

MEROPS, the BEE-EATER, in ornithology, the blue-breaſted iſpida, with a variegated head; a very beautiful bird, ſomewhat larger than the common king-fiſher. See ISPIDA.

MERULA, the BLACKBIRD, in ornithology, a ſpecies of the turdus or thruſh-kind. See the article TURDUS.

MESEMBRYANTHEMUM, fig-marigold, in botany, a genus of plants, whoſe flower is monopetalous and cut into many ſpear-ſhaped linear ſegments, and ranged in ſeveral ſeries: the ſtamina are compoſed of a great number of capillary filaments, terminated by incumbent antheræ: the fruit is a roundiſh fleſhy capſule, having ſeveral cells, which are filled with ſmall roundiſh ſeed.

There are great varieties of this genus, moſt of which are natives of the Cape of Good-Hope; and are preſerved in our green-houſes, either for the beauty of the flowers of ſome ſpecies, or the agreeable variety of the foliage of others: they are moſt of them perennial plants, and are eaſily raiſed from cuttings in the ſummer months.

This genus comprehends the ficoides of Tournefort.

MESENTERY, in anatomy, a thick fat membrane, placed in the midſt of the inteſtines, particularly of the ſmaller ones, whence it has the name. Its ſubſtance is compoſed of membranes, fat, veſſels of all kinds, and in the human body of a number of glands. In the upper part, it is connected with the three ſuperior vertebræ of the loins; and in the lower, with the inteſtines, and particularly with the jejunum and ileum; to which it alſo gives their outer coat. When it is ſeparated from the inteſtines, it has ſeveral folds reſembling gloves. Its length, in the whole, is about three ells, but the inteſtines which are joined to it, are at leaſt four times that length. Its coats or membranes are two, and between theſe there is a cellular ſubſtance which contains the fat: the meſeraic veſſels and glands are alſo placed there, which many reckon a third coat of the meſentery, and that not improperly; this they call the tunica celluloſa.

The veſſels of the meſentery are blood-veſſels, nerves, lacteals, and lymphatics. The blood-veſſels are the ſame with thoſe of the inteſtines, and theſe make a multitude of ſtrange meanders, and have very frequent anaſtomoſes. The nerves alſo come from the par vagum, and the intercoſtals.

MESNE, in law, ſignifies him who is lord of a manor, and who hath tenants holding of him, yet himſelf holding of a ſuperior lord. This word alſo ſignifies a writ, which lies where there is a lord-meſne and tenant, and the tenant is diſtrained for ſervices due from the meſne to the ſuperior lord.

MESCOLON, in anatomy, that part of the meſentery connected with the great guts, eſpecially the colon. See the article MESENTERY.

The meſocolon meets the midſt of the colon, to which it is joined. Its lower part ſticks to a part of the rectum.

MESOLABE, an inſtrument uſed by the antients for finding two mean proportionals mechanically, which they could not effect geometrically.

It conſiſted of three parallelograms, moving in a groove to certain interſections.

MESOLOGARITHMS, according to Keplar, are the logarithms of the co-ſines and co-tangents, the former of which were called by lord Napier antilogarithms, and the latter differentials.

They are otherwiſe called artificial ſines and tangents. See the articles LOGARITHM, SINE, TANGENT, &c.

MESPILUS, the medlar, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh concave petals inſerted in the cup; the ſtamina are from ten to twenty ſubulated filaments, topped with ſingle antheræ. The fruit is a globoſe umbilicated berry, carrying the cup on its top; and contains five oſſeous and gibbous ſeeds. This genus includes the ſeveral ſpecies of hawthorns, the glaſtenbury thorn, and pyracantha. The fruit of the common medlar is very grateful, though not eatable till it is rotten.

MESSIAH, the anointed; a title which the Jews gave to their expected great deliverer, whoſe coming they ſtill wait for; and a name the Chriſtians apply to Jeſus Chriſt, in whom the prophecies relating to the Meſſiah were accompliſhed. Among the Jews, anointing was the ceremony of conſecrating perſons to the higheſt offices and dignities; kings, prieſts, and ſometimes prophets, were anointed: thus Aaron and his ſon received the ſacerdotal, Eliſha the prophetic, and David, Solomon, and others, the royal unction.

METACARPUS, in anatomy, that part of the hand between the wriſt and the fingers.

METACARPUS, ſignifies alſo a ſmall, very fleſhy muſcle, ſituated obliquely between the large internal annular or tranſverſe ligament of the carpus, and the whole inſide of the fourth metacarpal bone.

METAGITNION, μεταγειτνιων, in chronology, the

the ſecond month of the Athenian year, containing twenty-nine days, and anſwering to the latter part of our July, and beginning of Auguſt.

METALS, *metalla*, in natural hiſtory, are defined to be foſſile bodies, fuſible by fire, concreting again in the cold, and malleable, or diſtenſible and ductile under the hammer. Theſe are the diſtinguiſhing characters of theſe bodies in their pure ſtate: but many of them are not found in this pure ſtate in the earth, being reduced by admixtures of ſulphur and other bodies to the ſtate of ore. See ORE. The claſs of the metals, according to theſe characters, include ſix bodies, viz. gold, ſilver, copper, tin, iron, and lead. For the properties, preparations, uſes, and peculiar characters, &c. of each, ſee the articles GOLD, SILVER, &c.

Prince's METAL, called alſo *Bath*-METAL, a kind of factitious metal, of a beautiful yellow, and diſpoſed to receive a fine poliſh, luſtre, &c. It is prepared, according to Dr. Shaw, as follows: take ſix ounces of copper, melting it in a wind-furnace; add to it one ounce of zink: then ſtirring the whole well together, pour out the metal immediately. The copper and zink may be put into the crucible together, if firſt covered over with the black flux, which prevents the evolution of the zink, or preſerves its metalline form. See the article FLUX.

Semi-METALS, metallic foſſils, fuſible by fire, and not malleable in their pureſt ſtate.

Theſe are all, in their native ſtate, penetrated by, and intimately mixed with ſulphur, and other adventitious matter, and reduced to what are called ores.

Of this ſeries of foſſils there are only five bodies, all naturally comprehended in the ſame claſs, but each making a ſeparate and diſtinct genus: theſe are antimony, biſmuth, cobalt, zink, and quickſilver. For the characters, preparations, and uſes of each, ſee ANTIMONY, BISMUTH, COBALT, ZINK, and MERCURY.

METAL, in heraldry. There are two metals uſed in heraldry, by way of colours, viz. gold and ſilver, in blazon called *or* and *argent*.

In the common painting of arms theſe metals are repreſented by white and yellow, which are the natural colours of thoſe metals. In engraving, gold is expreſſed by dotting the coat, &c. all over; and and ſilver, by leaving it quite blank.

It is a general rule in heraldry, never to place metal upon metal, nor colour upon colour; ſo that if the field be of one of the metals, the bearing muſt be of ſome colour; and if the field be of any colour, the bearing muſt be of one of the metals.

METALLIC, or METALLINE, an adjective applied to ſomething that bears a relation to metals. See METAL.

METALLURGY, *metallurgia*, according to Boerhaave, comprehends the whole art of preparing and working metals, from the glebe, or ore, to the utenſil; in which ſenſe, aſſaying, ſmelting, refining, ſmithery, gilding, &c. are only branches of metallurgy.

METAMORPHOSIS, in general, denotes the changing of ſomething into a different form; in which ſenſe it includes the transformation of inſects, as well as the mythological changes related by the antient poets.

Mythological metamorphoſes were held to be of two kinds, apparent and real: thus that of Jupiter into a bull, was only apparent; whereas that of Lycaon into a wolf, was ſuppoſed to be real.

Moſt of the ancient metamorphoſes include ſome allegorical meaning, relating either to phyſics or morality: ſome authors are even of opinion that a great part of the ancient philoſophy is couched under them; and lord Bacon and Dr. Hook have attempted to unriddle ſeveral of them.

Ovid's Metamorphoſes make an excellent ſyſtem of morality: the ſtories of Deucalion and Pyrrha, of Phaëton, of Baucis and Philemon, of Minos and Scylla, &c. being excellent leſſons in this way.

METAPHOR, in rhetoric, a trope, by which we put a ſtrange word for a proper word, by reaſon of its reſemblance to it; or it may be defined, a ſimile or compariſon intended to inforce or illuſtrate the thing we ſpeak of, without the ſigns or forms of compariſon. Thus, if we ſay, *God is* a ſhield *to good men*, it is a metaphor, becauſe the ſign of compariſon is not expreſſed, though the reſemblance which is the foundation of the trope, is plain; for as a ſhield guards him that bears it, againſt the attacks of an enemy, ſo the providence and favour of God protects good men from malice and misfortunes: but if the ſentence be put thus, *God is* as a ſhield *to good men*, then it becomes a ſimile or compariſon.

METAPHRASE, uſually ſignifies ſomething more than either a tranſlation or a paraphraſe: according to Baillet, a metaphraſt implies a tranſlator, gloſſator, and interpolator altogether.

METAPHYSICS, *Metaphyſica Tranſnaturalis*, ontology, or ontoſophy, a ſcience that treats of being, as ſuch, in the abſtract.

METAPLASMUS, in grammar, a tranſmutation or change made in a word, by adding, retrenching, or altering a letter or ſyllable thereof.

The ſeveral ſpecies of this figure are ten in number, viz. proſtheſis, epentheſis, paragogue, diæreſis, aphæreſis, ſyncope, apocope, craſis, metatheſis and antitheſis; four of which augment the letters or ſyllables of a word, four retrench them, and two alter them.

METASTASIS, in medicine, a tranſpoſition or ſettlement of ſome humour or diſeaſe, on ſome other part; and ſometimes it ſignifies ſuch an alteration of a diſeaſe, as is ſucceeded by a ſolution.

METATARSUS, in anatomy, a fleſhy maſs lying under the ſole of the foot.

METATHESIS, in grammar, a ſpecies of the metaplaſmus; being a figure whereby the letters or ſyllables of a word are tranſpoſed, or ſhifted out of their uſual ſituation, as piſtris for priſtis, lybia for libya, &c.

METEMPSYCHOSIS, the doctrine of tranſmigration, which ſuppoſes that human ſouls, upon their leaving the body, become the ſouls of ſuch kind of brutes as they moſt reſemble in their manners.

This was the doctrine of Pythagoras and his followers, who held that the ſouls of vicious men were impriſoned in the bodies of miſerable beaſts, there to do pennance for ſeveral ages, at the expiration whereof they returned again to animate men; but if they had lived virtuouſly, ſome happier brute, or even a human creature, was to be their lot. What led Pythagoras into this opinion was the perſuaſion he had that the ſoul was not of a periſhable nature; whence he concluded, that it muſt move into ſome other body upon its abandoning this. Lucan thinks this doctrine was contrived to mitigate the appehenſion of death, by perſuading men that they only changed their lodgings, and ceaſed to live only to begin a new life. Reuchlin denies this doctrine, and maintains, that the metempſychoſis of Pythagoras implied nothing more than a ſimilitude of manners and deſires formerly exiſting in ſome perſon deceaſed, and now reviving in another alive. Pythagoras is ſaid to have borrowed the notion of a metempſychoſis from the Egyptians; others ſay from the antient brachmans. It is ſtill retained among the antient Banians, and other idolaters of India and China, and makes the principal foundation of their religion. Many of the modern Jews are ſaid to eſpouſe this doctrine, and, to ſupport their opinion, quote theſe words of Job, "Lo all theſe things worketh God oftentimes with man (in Hebrew, *and thrice)* to bring back his ſoul from the pit to be enlightened with the light of the living." It is certain, that at the time of Jeſus Chriſt this opinion was very common among the Jews: this appears in the Goſpel, when they ſay that ſome thought Jeſus Chriſt to be John the Baptiſt, others Elias, others Jeremiah, &c.

METEMTOSIS, a term in chronology, expreſſing the ſolar equation, neceſſary to prevent the new moon from happening a day too late, by which it is oppoſed to proemptoſis, which ſignifies the lunar equation neceſſary to prevent the new moon from happening a day too ſoon.

METEOR, in phyſiology, an imperfect, changeable, and mixt body, or the reſemblance of a body appearing in the atmoſphere, and formed by the action of the heavenly bodies, out of the common elements.

METHOD, μεθοδος, in logic, &c. the arrangement of our ideas in ſuch a regular order, that their mutual connection and dependence may be readily comprehended. See IDEA and KNOWLEDGE.

METHODISTS, a name at firſt given to a ſociety of religious young men at Oxford, and now applied to all thoſe who adhere to the doctrine of the church of England as taught by Whitefield, Weſley, &c.

METHODISTS, *Methodici*, is alſo an appellation given a ſect of ancient phyſicians, who reduced the whole healing art to a few common principles or appearances.

METOCHE, in ancient architecture, a term uſed by Vitruvius to ſignify the ſpace or interval between the dentils.

METONIC CICLE, in chronology, the ſame with the cycle of the moon. See CYCLE.

METONYMY, in rhetoric, is a trope in which one name is put for another, on account of the near relation there is between them.

METOPE, *Metopa*, in architecture, is the interval or ſquare ſpace between the triglyphs of the Doric frieze, which, among the ancients, uſed to be painted or adorned with carved work, repreſenting the heads of oxen, or utenſils uſed in ſacrifices.

Semi-METOPE, in architecture, is a ſpace in the corner of the Doric frieze, ſomewhat leſs than half a metope.

METOPOSCOPY, the pretended art of knowing a perſons diſpoſitions and manners, by viewing the traces and lines in the face. See PHYSIOGNOMONICS.

METRE, μετρια, in poetry, a ſyſtem of feet of a juſt length. See NUMBERS.

METRETES, an ancient meaſure of capacity, containing a little more than nine gallons.

METRICAL, ſomething relating to metre.

METROPOLIS, the capital or principal city of a country or province.

MEUM, ſpignel, in botany. See SPIGNEL.

MEW, a place where a hawk is ſet, during the time ſhe raiſes her feathers.

MEWING, the falling off, or change of hair, feathers, ſkin, horns, or other parts of animals, which in ſome happens annually, in others only at certain ſtages of their lives: but the generality of beaſts mew in the ſpring.

MEZEREON, in botany, a ſhrub common in our gardens; the flowers come out very early in the ſpring, before the leaves appear, growing in cluſters all round the ſhoots of the former year; there are commonly three flowers produced from each knot or joint ſtanding on a ſhort foot-ſtalk: when the flowers are decayed, they are ſucceeded by ſmooth ſpear-ſhaped leaves, about two inches long, which are irregularly placed on the branches: the fruit is an oval berry, which ripens in June.

The mezereon is propagated by ſowing the ſeeds ſoon after they are ripe; and when the plants have

remained two years in the ſeed bed, they may, in autumn, be tranſplanted into the nurſery, there to remain two years more, at which time they may be planted where they are intended to remain.

Although the birds are very fond of the berries of this plant, when they are ripe, yet they are ſo very acrid as to burn the mouths and throats of thoſe perſons who incautiouſly taſte them.

There are two ſorts of mezereon, one producing white flowers with yellow berries, and the other having pink coloured flowers with red berries.

For the generical characters of mezereon, ſee the article DAPHNE, of which it is held a ſpecies.

MEZZOTINTO, a particular manner of repreſenting figures on copper, ſo as to form prints in imitation of painting in Indian ink.

The manner of making mezzotintos is very different from all other kinds of engraving and etching, ſince inſtead of forming the figures with lines and ſcratches, made with the point of a graver, or by means of aqua-fortis, they are wholly formed by ſcraping and burniſhing.

Mezzotintos are made in the following manner: Take a well-poliſhed copper-plate, and beginning at the corner, rake or furrow the ſurface all over with a knife or inſtrument made for the purpoſe, firſt one way and then the other, till the whole is of a regular roughneſs, without the leaſt ſmooth part to be ſeen; in which ſtate, if a paper was to be worked off from it at the copper-plate preſs, it would be all over black. When this is done, the plate is rubbed over with charcoal, black-chalk, or black-lead, and then the deſign is drawn with white chalk; after which, the out-lines are traced out, and the plate finiſhed by ſcraping off the roughneſs, ſo as to leave the figure on the plate.

The out-lines and deepeſt ſhades are not ſcraped at all, the next ſhades are ſcraped but little, the next more, and ſo on, till the ſhades gradually falling off, leave the paper white, in which places the plate is neatly burniſhed.

By an artful diſpoſition of the ſhades, and different parts of a figure on different plates, mezzotintos have been printed in colours, ſo as nearly to repreſent very beautiful paintings.

MIASMA, among phyſicians, denotes the contagious effluvia of peſtilential diſeaſes, whereby they are communicated to people at a diſtance.

MICAH, or *the Book of* MICAH, a canonical book of the Old-Teſtament, written by the prophet Micah, who is the ſeventh of the twelve leſſer prophets. He is cited by Jeremiah, and propheſied in the days of Jotham, Ahaz, and Hezekiah. He cenſures the reigning vices of Jeruſalem and Samaria, and denounces the judgments of God againſt both kingdoms. He likewiſe foretels the confuſion of the enemies of the Jews, the coming of the Meſſiah, and the glorious ſucceſs of his church.

MICHAELMAS, or *Feaſt of St.* MICHAEL *and all Angels*, a feſtival of the Chriſtian church, obſerved on the twenty-ninth of September.

MICHELIA, in botany, a genus of plants, whoſe flower conſiſts of eighteen lanceolated petals, with many, very ſhort, ſubulated filaments, topped with erect pointed antheræ: the fruit is compoſed of a number of globoſe unilocular berries, each containing four ſeeds, convex on one ſide and angulated on the other.

MICROCOSM, *μικροκοσμος*, a Greek term, ſignifying the little world; uſed by ſome for a man, as being ſuppoſed an epitome of the univerſe, or great world.

MICROGRAPHY, *μικρογραφια*, the deſcription of objects, too minute to be viewed without the aſſiſtance of a microſcope. See the article MICROSCOPE.

MICROMETER, an aſtronomical machine, which, by means of a ſcrew, ſerves to meaſure extremely ſmall diſtances in the heavens, &c. and that to a great degree of accuracy.

The micrometer conſiſts of a graduated circle, (plate LXXI. *fig.* 1.) of a ſcrew *q o*, and its index *q r*. The threads of the ſcrew are ſuch, that 50 make the length of one inch exactly. When it is to be uſed, the point *o* is ſet to the ſide of the part to be meaſured, and then the index is turned about with the finger, till the eye perceives the point has juſt paſſed over the diameter of the part; then the number of turns, and parts of a turn, ſhewn by the graduated circle, will give the dimenſions in part of an inch, as we ſhall ſhew by the following example: Suppoſe it required to meaſure the diameter of an human hair, and I obſerve the index is turned juſt once round, while the point *o* paſſes over it. Then it is plain, the diameter of the hair in the image is $\frac{1}{50}$ of an inch. Now, if the microſcope I D E F *d e f*, magnifies 6 times, or makes the image 6 times larger in diameter than the object, then is the diameter of the hair itſelf but $\frac{1}{6}$ of $\frac{1}{50}$, that is, but $\frac{1}{300}$ part of an inch.

Alſo, it is to be obſerved, that as there are 10 large diviſions and 20 ſmall ones, on the micrometer-plate, ſo each of thoſe ſmall diviſions are the $\frac{1}{20}$ of $\frac{1}{50}$, or the $\frac{1}{1000}$ part of an inch. Therefore, if, in meaſuring any part of an object, you obſerve how many of theſe ſmaller diviſions are paſſed over by the index, you will have ſo many thouſandth parts of an inch for the meaſure required. All which is ſo plain, that nothing can be ſaid to illuſtrate the matter.

MICROPUS, baſtard cudweed, in botany, an annual plant, whoſe root ſends forth ſeveral trailing ſtalks, which are furniſhed with ſeveral ſmall oval leaves of a bright ſilvery colour, whoſe baſe embraces the ſtalk. The flowers are female and hermaphrodite, and come out in cluſters from the wings

wings of the ſtalks. The female flowers have neither corolla nor pericarpium, but the ſeeds are included in the cup, which is immutable; the hermaphrodite flowers are monopetalous and infundibuliform, but are barren.

MICROSCOPE, an optical inſtrument, by means whereof, very minute objects are repreſented, exceedingly enlarged, and are viewed very diſtinctly, according to the laws of refraction or reflection. See REFRACTION and REFLECTION.

Microſcopes are either ſingle or double; a ſingle microſcope is only a very ſmall globule of glaſs, or a ſmall double convex glaſs, whoſe focal diſtance is very ſhort. A minute object *p q* (plate LXXI. *fig.* 2.) ſeen diſtinctly through a ſmall glaſs A E by the eye put cloſe to it, appears ſo much greater than it would to the naked eye, placed at the leaſt diſtance *q* L, from whence it appears ſufficiently diſtinct, as this latter diſtance *q* L is greater than the former *q* E. For having put your eye cloſe to the glaſs E A, in order to ſee as much of the object as poſſible at one view, remove the object *p q* to and fro, till it appears moſt diſtinctly, ſuppoſe at the diſtance E *q*. Then conceiving the glaſs A E to be removed, and a thin plate, with a pin-hole in it, to be put in its place, (*fig.* 3.) the object will appear diſtinct, and as large as before, when ſeen through the glaſs, only not ſo bright. And in this latter caſe, it appears ſo much greater than it does to the naked eye, at the diſtance *q* L, either with the pin-hole or without it, as the angle *p* E *q* is greater than the angle *p* L *q*, or as the latter diſtance *q* L is greater than the former *q* E. Since the interpoſition of the glaſs has no other effect than to render the appearance diſtinct, by helping the eye to increaſe the refraction of the rays in each pencil, it is plain that the greater apparent magnitude is entirely owing to a nearer view than could be taken by the naked eye. If the eye be ſo perfect as to ſee diſtinctly by pencils of parallel rays falling upon it, the diſtance, E *q*, of the object from the glaſs, is then the focal diſtance of the glaſs. Now if the glaſs be a ſmall round globule whoſe diameter is $\frac{1}{15}$ of an inch, its focal diſtance E *q* being three quarters of its diameter, is $\frac{1}{20}$ of an inch; and if *q* L be eight inches, the uſual diſtance at which we view minute objects, this globule will magnify at the rate of 8 to $\frac{1}{20}$ or of 160 to 1.

In microſcopes made with ſingle lenſes, a given object placed at their principal focuſes will appear equally diſtinct, if their linear apertures be as their focal diſtances. And in microſcopical lenſes, whoſe focal diſtances are not much longer than half an inch, there is no need to contract their apertures, for procuring diſtinct viſion; the pupil itſelf being ſmall enough to exclude the exterior ſtraggling rays. But in ſmaller lenſes, where apertures are neceſſary, to preſerve the ſame degree of diſtinctneſs, their diameters muſt be as their focal diſtances; and then their apparent brightneſs will decreaſe in a duplicate ratio of their focal diſtances, ſo that by uſing ſmaller glaſſes the apparent magnitude and the obſcurity of the object will both increaſe in the ſame ratio.

A double microſcope is compoſed of two convex glaſſes placed at E and L (*fig.* 4.) The glaſs L next the object P Q is very ſmall, and very much convex, and conſequently its focal diſtance L F is very ſhort; the diſtance L Q of the ſmall object P Q, is but a little greater than L F; ſo that the image *p q*, may be formed at a great diſtance from the glaſs, and conſequently may be much greater than the object itſelf. This picture *p q* being viewed through a convex eye-glaſs A E, whoſe focal diſtance is *q* E, appears diſtinct. Now the object appears magnified upon two accounts; firſt, becauſe if we viewed its picture *p q* with the naked eye, it would appear as much greater than the object, at the ſame diſtance, as it really is greater than the object, or as much as L *q* is greater than L Q; and ſecondly, becauſe this picture appears magnified through the eye-glaſs as much as the leaſt diſtance at which it can be ſeen diſtinctly with the naked eye, is greater than *q* E, the focal diſtance of the eye-glaſs. For example, if this latter ratio be 5 to 1, and the former ratio of L *q* to L Q be 20 to 1, then upon both accounts the object will appear 5 times 20, or 100 times greater than to the naked eye.

To fit theſe microſcopes to ſhort-ſighted eyes, the glaſſes E and L muſt be placed a little nearer together; ſo that the rays of each pencil may not emerge parallel, but may fall diverging upon the eye; and then the apparent magnitude will be altered a little, but ſcarce ſenſibly.

The Solar or Camera Obſcura MICROSCOPE, depends on the ſun-ſhine, and muſt be made uſe of in a darkened chamber, as its name implies. This inſtrument conſiſts of ſeveral parts, viz. A (plate LXXI. *fig.* 5.) a ſquare frame of mahogany to be fixed to the ſhutter of a window, by means of the ſcrews 1, 1. To this frame is applied a circular collar of the ſame wood, with a groove on its perephery on the outſide, denoted by 2, 3. This collar is connected by a cat-gut to the pulley 4 on the upper part, which is turned round by the pin 9 within. On one part of the collar, on the outſide, is faſtened, by hinges, a looking-glaſs G, in a proper frame, to which is fixed the jointed wire 6, 7; by which means, and the ſcrew H 8, it may be made to ſtand in an angle more or leſs inclined to the frame. In the middle of the collar is fixed a tube of braſs C, near two inches in diameter; the end of which, on the outſide, has a convex lens 5 to collect the ſun-beams thrown on it by the glaſs G, and converging them towards a focus in the other part, where D is a tube ſliding in and out to adjuſt the object to a due diſtance from the focus. To the end G of another tube F, is ſcrewed one of

Fig. 1. Micrometer.

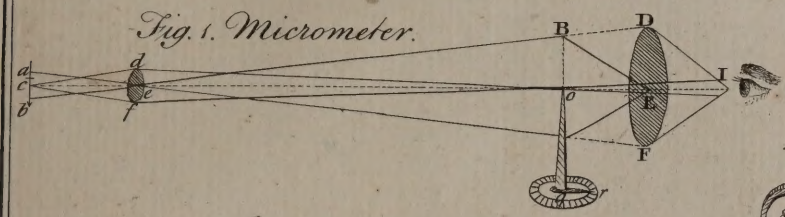


Fig. 7. Mirrour.

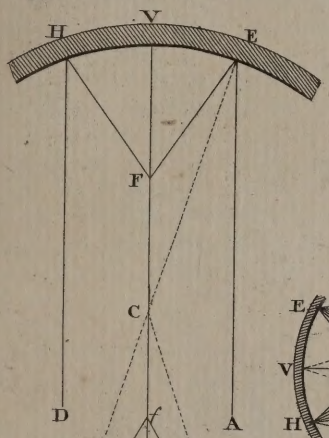


Fig. 8.

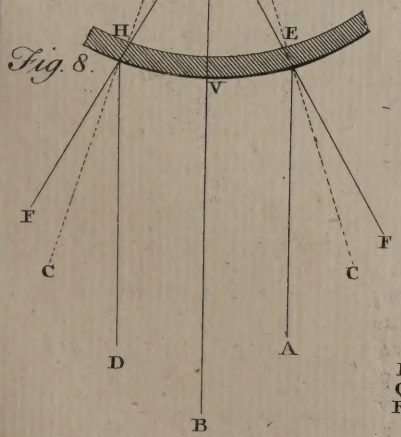
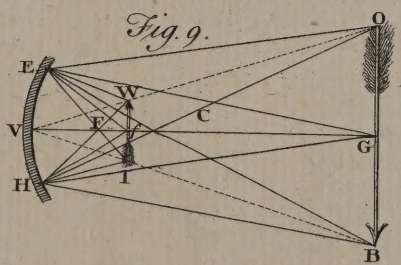


Fig. 9.



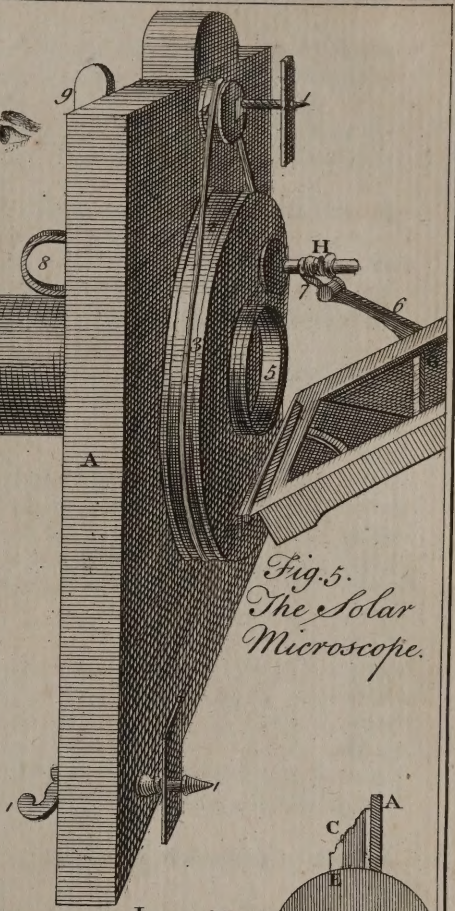


Fig. 5. The Solar Microscope.

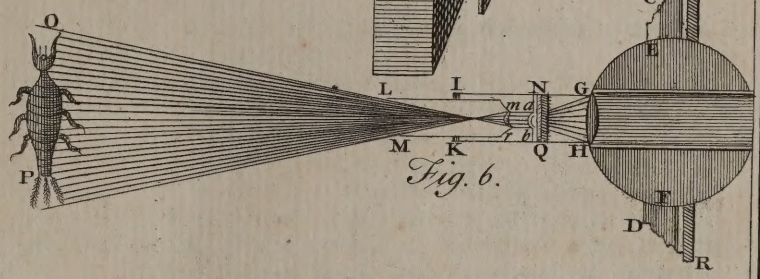


Fig. 6.

Fig. 4. Double Microscope.

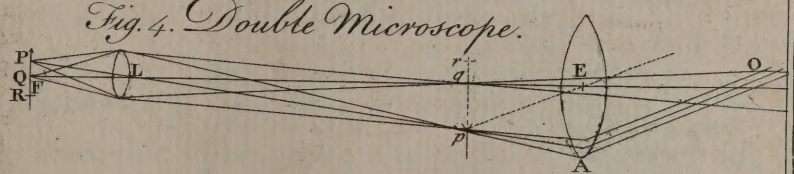


Fig. 2. Single Microscope.

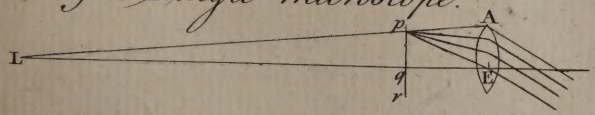
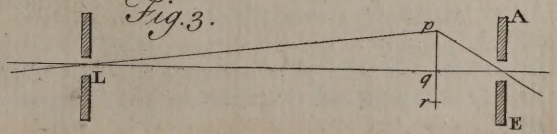


Fig. 3.



Wilson's single pocket-microscopes, containing the object to be magnified in a slider; and by the tube F, sliding on the small end E of the tube D, it is brought to a due focal distance.

The sun's rays being directed by the looking-glass through the tube upon the object, the image or picture of the object is thrown distinctly and beautifully upon a screen of white paper, or a white linen sheet, placed at some distance to receive the same; and may be magnified to a size beyond the imagination of those who have not seen it. For the farther off the screen is removed, the larger will the object appear, insomuch that a louse may be magnified to the length of five or six feet, or even a great deal more; but it is more distinct when not enlarged to above half that size.

This instrument has been contrived very commodiously in several different forms; but we shall here illustrate the following by a diagram. A R (*fig.* 6.) is a section of the window-shutter of a dark room, C D of the frame containing a scioptric ball E F; in the forepart whereof is screwed the tube G I K H, at one end of which is a lens G H, which, by converging the sun-beams into a narrow compass, does strongly enlighten the small object *a b*, placed on a slip of glass, or otherwise, in the part of the tube N Q, where a slit is made on each side for that purpose. Within this tube there slides another, L *mr* M, which contains a small magnifying lens *mr*. By moving the exterior tube, I G H K, one way and the other, the glass G H will be brought to receive the rays of the sun directly, and will therefore most intensely illuminate the object *a b*. The other tube, L M, being slid backwards and forwards, will adjust the distance of the smaller lens *mr*, so that the image of the object *a b* shall be made very distinct, on the opposite side of the room at O P; and the magnitude of the image will be to that of the object, as its distance from the lens *mr* is to the distance of the object from it, as is evident from the figure.

Thus, for example, suppose the focal distance of the lens *mr* to be one inch $= r$, and let the distance at which it is placed from the object be 1, $1 = d$; then, if the lens be double and equally convex, as usual, the distance of the image will be $\frac{dr}{d-r} = f =$ 110; therefore the image will be 110 times larger than the object in its linear dimensions, and $110 \times 110 = 12100$ times larger in surface; and in solidity it will $110 \times 110 \times 110 = 1333000$ times larger than the object.

This is the most entertaining of any; and, perhaps, the most capable of making discoveries in objects that are too opake, as it shews them much larger than can be done any other way. Such too as have no skill in drawing, may, by this contrivance, easily sketch out the exact figure of any object they have a mind to preserve a picture of.

MID-HEAVEN, the point of the ecliptic that culminates, or in which it cuts the meridian.

MIGNONETTE, in botany, a species of the reseda. See the article RESEDA.

MILIUM, millet, in botany. See the article MILLET.

MILDEW, *rubigo*, a disease happening to plants, caused by a dewy moisture, supposed by some to be a species of blight. See the article BLIGHT.

MILE, *mille passus*, a measure of length or distance, containing eight furlongs, &c. See the article MEASURE.

The English statute mile is fourscore chains, or 1760 yards; that is, 5280 feet.

We shall here give a table of the miles in use among the principle nations of Europe, in geometrical paces, 60,000 of which make a degree of the equator.

	Geometrical paces.
Mile of Russia	750
of Italy	1000
of England	1250
of Scotland and Ireland	1500
Old league of France	1500
The small league, ib.	2000
The mean league, ib.	2500
The great league of France	3000
Mile of Poland	3000
of Spain	3248
of Germany	4000
of Sweden	5000
of Denmark	5000
of Hungary	6000

MILIARY-FEVER, a malignant fever, so called from the eruption of certain pustules resembling millet-seeds.

MILITARY, something belonging to the soldiery or militia.

MILITARY ARCHITECTURE, the same with fortification. See FORTIFICATION.

MILITARY ART, the science or art of making or sustaining war to advantage.

MILITARY WAYS, *Viæ Militares*, the large Roman roads which Agrippa procured to be made through the empire in Augustus's time, for the marching of troops and conveying of carriages. These were paved from the gates of Rome, to the utmost limits of the empire. See ROAD.

MILITIA, in general, denotes the body of soldiers, or those who make profession of arms.

In a more restrained sense, militia denotes the trained bands of a town or country, who arm themselves, upon a short warning, for their own defence. So that, in this sense, militia is opposed to regular or stated troops.

MILK, *Lac*, a well known animal fluid, which nature prepares in the breasts of women, and the udders of other animals, for the nourishment of their young. Milk, according to Boerhaave, is a liquor pre-

prepared from the aliment chewed in the mouth, digeſted in the ſtomach, perfected by the force and juices of the inteſtines, and elaborated by means of the meſentery and its gland and juices, and the juices of the thoracic duct. It has undergone ſome actions of the veins, arteries, heart, lungs, and juices, and began to be aſſimilated; yet may ſtill be had ſeparate and diſcharged out of the body. And thus by their own milk, prepared from the proper matter of the chyle, all the known lactiferous animals are nouriſhed, both male and female. For milk is always prepared from chyle as well in men as in women, in virgins and barren women, in mothers and nurſes. Whence every ſuch animal conſiſts, is nouriſhed, and lives on its own proper milk; and from this alone prepares all the other parts, both the ſolid and fluid, by means of the vital actions. It is alſo certain that many live for years by feeding on milk alone, and perform all the actions of life, and have all the ſolid and fluid parts of their bodies perfectly elaborated: the ſerum, therefore, the blood, the lymph, the ſpirits, bones, cartilages, membranes, and veſſels, proceed from milk; and milk muſt contain in itſelf the matter of all the parts of the human body.

MILK *of Sulphur*. See SULPHUR.

MILK-VETCH, *Aſtragalus*, in botany. See ASTRAGALUS.

MILK-WORT, *Polygala*, in botany. See POLYGALA.

MILL, a machine or engine for grinding corn, &c. of which there are ſeveral kinds, according to the various methods of applying the moving power; as water-mills, wind-mills, mills worked by horſes, &c.

In water-mills the momentum of the water is the moving power, and the attrition of the two ſtones in grinding, is the force to be overcome. Of theſe there are two kinds, viz. thoſe where the force of the water is applied above the wheel, and thoſe where it is applied below the wheel; the former being called over-ſhot, and the latter under-ſhot mills; and to theſe we may add a breaſt-mill; where the water ſtrikes againſt the middle of the wheel.

MILLEFOLIUM, yarrow, in botany. See the article ACHILLEA.

MILLENARIANS, or CHILIASTS, a name given to thoſe, who, in the primitive ages, believed that the ſaints will one day reign on earth with Jeſus Chriſt a thouſand years. The former appellation is of latin original, the latter of Greek, and both of the ſame import.

The millenarians held that after the coming of antichriſt, and the deſtruction of all nations, which ſhall follow, there ſhall be a firſt reſurrection of the juſt alone: that all who ſhall be found upon earth, both good and bad ſhall continue alive; the good, to obey the juſt who are riſen, as their princes; the bad, to be conquered by the juſt, and to be ſubject to them: that Jeſus Chriſt will then deſcend from heaven in his glory: that the city of Jeruſalem will be rebuilt, enlarged, embelliſhed, and its gates ſtand open night and day. They applied to this new Jeruſalem, what is ſaid in the Apocalypſe, ch. xxi. and to the temple, all that is written in Ezekiel xxxvi. Here they pretended Jeſus Chriſt will fix the ſeat of his empire, and reign a thouſand years with the ſaints, patriarchs and prophets, who will enjoy perfect and uninterrupted felicity.

This reign of our Saviour on earth is uſually ſtyled the millenium, or reign of a thouſand years.

MILLEPES, the common WOOD-LOUSE, a ſpecies of the oniſcus with a blunt forked tail.

MILLERIA, in botany, a genus of plants, whoſe flowers are compounded and radiated, conſiſting of ſeveral hermaphrodite and female corrollulæ; the hermaphrodite are monopetalous, tubuloſe, and quinquedentated; and the female are ligulated, obtuſe, concave, and emarginated; there is ſcarce any viſible recepticle for the ſeeds, which are ſingle, without down, and produced only from the female florets.

MILLET, *millium*, in botany, a genus of plants, of the grameneous kind, the flower cup of which is a bivalvular glume, the corolla is leſs than the cup, and is alſo bivalvular; it has three very ſhort capillary filaments terminated by oblong antheræ: the ſeeds are roundiſh and covered by the corolla.

The ſeeds of millet are much uſed as a common aliment in the eaſtern countries, where they boil it in milk, it having the ſame virtues as rice: they are accounted drying, and recommended in fluxes; they are alſo ſaid to promote ſweat and urine very powerfully.

MILLING, in the manufacture of cloth, the ſame with fulling. See FULLING.

Milling of ſilk, is an operation otherwiſe called throwing.

MILLION, in arithmetic, the number of ten hundred thouſand, or a thouſand times a thouſand.

MILVUS, the kite, in ornithology, a ſpecies of falcon, with a forked tail, a yellow cera, a brown body, and a whitiſh head. It is a very common bird with us, about the ſize of a large tame pigeon.

MIME, μιμος, in the antient comedy, a perſon who acted any character by mere geſtures, and hence denominated pantomime. See the article PANTOMIME.

MIMESIS, μιμησις, in rhetoric, the imitating the voice and geſtures of another perſon.

MIMOSA, the ſenſitive plant, in botany, a genus, whoſe flower has a ſingle ſmall infundibuliform corolla, lightly cut at the extremity into five parts; the ſtamina are a number of long hairy filaments,

terminated with incumbent antheræ; the fruit is a long articulated pod, containing ſeveral compreſſed roundiſh ſeeds.

To this genus Linnæus has added the acacia of Tournefort, and the inga of Plumier.

There are ſeveral ſpecies of the mimoſa, but the ſenſative plant, or humble plant (ſo denominated from its remarkable property of receding from the touch, and giving ſigns as it were of animal life and ſenſation, which has hitherto not been accounted for) performs its motions by means of two diſtinct articulations; that is, either by touching the leaves lightly they then contract themſelves together, and if the motion wherewith the plant is moved be ſtrong, then the leaves not only contract but the footſtalk which ſupports them alſo declines from that part of it which connects with the branch, as though it were faſted to it by a kind of hinge; when the leaves are thus ſtruck, the whole plant appears as though it were withered, like others which happen to be tranſplanted in very hot weather; but it may be remarked, that theſe plants are more ſuſceptible of the touch in very warm weather then when it is cool, and in about ten minutes or a quarter of an hour the leaves expand again.

The ſenſitive plant being a native of the Weſt Indies, it therefore requires a hot-houſe in this climate: they are commonly propagated from ſeeds, which ſhould be ſown in the ſpring upon a hot bed; in about three weeks after the plants are come up they ſhould be tranſplanted ſingly into ſmall pots, and plunged in a freſh hot bed, and afterward when ſummer is come on may be removed into a hot-houſe; or where that conveniency is wanting, they may be kept under a common glaſs light, it being neceſſary to protect them from the open air, not only on account of their tenderneſs, but alſo to keep their leaves expanded; in the hot-houſe they may be kept the winter, and the following ſummer they will flower and perfect their ſeeds.

MIMULUS, in botany, a genus of plants, whoſe flower is monopetalous and ringent, the tube is the length of the cup, and the limb is bilabiated: the ſtamina are four ſlender filaments, topped with bifid reniform antheræ. The fruit is an oval bilocular capſule, containing many ſmall ſeeds

MIMUSOPS, in botany, a genus of plants, whoſe flower contains eight lanceolated patent petals, with eight very ſhort piloſe filaments, topped with erect oblong antheræ. The fruit is an oval acuminated drupe, incloſing one or two oval ſeeds.

MINA, in Grecian antiquity, a money of account, equal to an hundred drachms. See MONEY and DRACHM.

MINCIO, or MENZO, a river of Italy, which, after running through the dutchy of Mantua diſcharges itſelf into the Po, at Borgoforte.

MIND, *mens*, *νους*, a thinking intelligent being, otherwiſe called ſpirit, in oppoſition to matter or body. See the articles BODY and SPIRIT.

MINE, in natural hiſtory, a place under ground, where metals, minerals, or even precious ſtones are dug up.

MINE, in the military art, denotes a ſubterraneous canal, or paſſage, dug under the wall or rampart of a fortification, intended to be blown up by gun-powder.

MINERAL, in natural hiſtory, is uſed, in general, for all foſſil bodies, whether ſimple or compound, dug out of a ſubterraneous mine, from which it takes its denomination.

MINERAL *Waters*, in medicine, all thoſe wherein any medicinal virtue, beſides thoſe of common water, are found.

Theſe mineral waters are of various kinds, but they are conſidered under the general titles of chalybeate, purgative, and alterative.

MINERVALIA, in Roman antiquity, feſtivals celebrated in honour of Minerva, in the month of March; at which time the ſcholars had a vacation, and uſually made a preſent to their maſters, called from this feſtival minerval.

Theſe feſtivals were otherwiſe called quinquatria, from their laſting five days. See the article QUINQUATRIA.

MINHO, a great river of Spain, which, taking its riſe in Gallicia, divides that province from Portugal, and falls into the Atlantic at Caminha.

MINIATURE, a delicate kind of painting, diſtinguiſhed from all others by the ſmallneſs of the figures, it being performed with dots or points, inſtead of lines; by the faintneſs of the colouring; its requiring to be viewed very near; and by its being uſually done on vellum.

This is the niceſt and moſt tedious of all kinds of painting, being performed wholly with the point of the pencil: for when the colours are laid on flat without dotting, though the figures be ſmall, and the ground either vellum or paper, it is not called painting in miniature, but waſhing.

MINIM, in muſic, a note equal to two crotchets, or half a ſemibreve.

MINIMS, a religious order in the church of Rome, founded by St. Francis de Paula, towards the end of the fifteenth century. Their habit is a coarſe black woollen ſtuff, with a woollen girdle of the ſame colour, tied in five knots. They are not permitted to quit their habit and girdle night or day. Formerly they went bare-footed, but are now allowed the uſe of ſhoes.

MINIMUM, in the higher geometry, the leaſt quantity attainable in a given caſe. See the article MAXIMUM.

MINION, a piece of cannon, at preſent but little

little uſed in the field. For its length bore, and the weight of the ball it carries, ſee CANNON.

MINIUM, or RED-LEAD, a preparation of lead uſed both in pharmacy and painting. It is made in the following manner: melt lead in a broad earthen veſſel unglazed, and ſtir it continually with a ſpatula till it be calcined into a grey powder; this is called the calx of lead: continue the fire, ſtirring it in the ſame manner, and it becomes yellow; in this ſtate it is called maſticot: after this put it into a reverberatory furnace, and it will calcine farther, and become of a fine red, which is the common minium or red-lead. Minium is uſed externally on many occaſions. It obtunds the acrimony of the humours, allays inflammations, and is excellent in cleanſing and healing old ulcers; and on theſe occaſions, it is uſed in many of the plaſters and ointments of the ſhops.

MINOR, in law, is an heir either male or female, before they arrive at the age of twenty-one; during the minority of ſuch, they are uſually incapable of acting for themſelves.

MINOR, in logic, the ſecond propoſition of a regular ſyllogiſm.

MINOR, in muſic, ſignifies leſs, and is applied to certain concords or intervals which differ from others of the ſame denomination by half a tone: thus we ſay a third minor, meaning a leſs third; a ſixth major and minor.

MINOTAUR, *minotaurus*, in antiquity, a fabulous monſter much talked of by the poets, feigned to be half man and half bull.

MINSTREL, an antient term for a fiddler, or player on any other kind of muſical inſtrument.

MINT, the place in which the king's money is coined. See COINAGE.

MINT, *Mentha*, in botany, a genus of plants, whoſe flower is monopetalous, and divided into four almoſt equal ſegments at the limb; it has no pericarpium, but the ſeeds, which are four in number, are contained in the bottom of the cup.

There are various ſpecies of mint, as ſpear-mint, pepper-mint, calimint, orange-mint, curled or criſp mint, water-mint, with ſeveral others of leſs note; but the moſt uſeful are the ſpear-mint and pepper-mint, which are ſo well known, that a deſcription of them is unneceſſary; theſe ſpecies are cultivated in our gardens for culinary and medicinal purpoſes; they are eaſily propagated by parting their roots in the ſpring, or by planting cuttings of them in the ſummer months.

Spear-mint is ſtomachic, cephalic, and carminitive, it is excellent in the loſs of appetite, reachings to vomit, as alſo in ſtopping fluxes of the belly; as it reſolves coagulated blood, and eaſes the pains of the cholic; and its fragrant ſcent makes it enter into many compoſitions as a cephalic: it may be drank as tea, either green or dry, and the infuſion ſhould be ſtrong.

Externally it is uſed with good ſucceſs in fomentations outwardly applied, with hot cloths, to the ſtomach and belly in the forementioned caſes.

Pepper-mint is more pungent to the taſte than ſpear-mint: the diſtilled water from this plant is much in eſteem for its great uſe in flatulent cholics, and many cold diſeaſes; its effects are almoſt immediately felt, for it cauſes a glowing warmth to be felt throughout all parts of the body.

As the diſtilled water of all ſorts of mint is eſteemed a very wholeſome cordial dram, it might be ſubſtituted inſtead of thoſe intoxicating ſpirits which the common people make uſe of; for the pepper-mint water is as warm to the ſtomach as any other ſort of dram, and more ſo than thoſe noxious ſpirits; and if this was judiciouſly mixed with ſome other agreeable aromatic herbs, there might certainly be diſtilled a liquor much more palatable and wholeſome than what is now vended in common, whereby the lower claſs of people would be leſs debauched; therefore it will be better for the public not only if the leſs hurtful drams were made, but alſo by the introducing more generally the diſtillation of herbs, there will be leſs occaſion for the uſing of wheat for ſuch purpoſes; which is a matter of no ſmall conſequence to this nation.

When mint is to be cut for medicinal uſe, it ſhould be done in dry weather, juſt when it is in full flower; for if it is cut wet, it will change black and be good for nothing: it ſhould be dried in the ſhade, and afterwards hung up in a dry place, where it may remain till it is wanted.

Cat MINT, *Nepeta*, in botany. See the article NEPETA.

MINUET, in muſic, a very graceful kind of dance, which conſiſts of a coupee, a high ſtep, and a balance; it begins with a beat, and its motion is triple.

MINUSCULE, the ſmall letters, in contradiſtinction to the majuſculæ or capitals.

MINUTE, in geometry, the ſixtieth part of a degree of a circle.

MINUTE *of time*, the ſixtieth part of an hour.

MINUTE, in architecture, uſually denotes the ſixtieth, ſometimes the thirtieth part of a module.

MINUTE is alſo uſed for a ſhort memoir, or ſketch of a thing taken in writing.

MIRABILIS, marvel of Peru, in botany, a genus of plants whoſe flower is monopetalous and infundibuliform, having a long ſlender tube ſitting on a globoſe nectarium, with five filiform ſtamina. The fruit is an oval pentagonal nut, containing a ſingle ſeed.

Tournefort and Linnæus will have the root of a ſpecies of this genus to be the true jalap of the ſhops, but Houſton declares that the jalap is a root of a ſpecies of convulvulus; however, the roots of the known ſpecies of mirabilis are cathartic, and anſwer

swer the same purpose as jalap if the dose is given in a double quantity.

MIRACLE, is defined by Dr. Samuel Clarke, to be a work effected in a manner different from the common and regular method of providence, by the interposition either of God himself or some intelligent agent superior to man.

MIRROUR, *Speculum*, in catoptrics, any polished body, impervious to the rays of light, and which reflects them equally.

Mirrours were anciently made of metal; but, at present, are generally smooth plates of glass, tinned or quicksilvered on the back part, and called looking-glasses.

The doctrine of mirrours depends wholly on that fundamental law, that the angle of reflection is always equal to the angle of incidence.

Let EH (plate LXXI. *fig.* 7.) be a concave mirrour, V its vertex, and C the center of its concavity. Let A be a ray of the sun's light incident on the point E, and draw EC, which will be perpendicular to the mirrour in the point E; make the angle CEF equal to the angle AEC, then shall EF be the reflected ray. Thus also HF will be the reflected ray of the incident one DH, at an equal distance on the other side of the axis BV.

If now the points E and H be taken very near the vertex V, we shall have EF, or HF, very nearly equal to FV; but EF = FC; therefore FV = FC = $\frac{1}{2}$ CV. That is, the focal distance FV of parallel rays will be at the distance of half the radius CV of the concavity of the mirrour, from vertex V, in the axis BV.

After the same manner a convex mirrour is shewn to reflect the rays AE, DH, (*fig.* 8.) into EF, HF, as if they came diverging from a point *f* in the axis CV, which is half the radius CV distant from the vertex V. But since the rays do not actually come at, or from the focus *f*, it is called the imaginary or virtual focus. See Focus.

Parallel rays falling directly on a plane speculum are reflected back upon themselves; if they fall obliquely, they are reflected in the same angle, and parallel as they fell. Hence there is no such thing, properly speaking, as a focus belonging to a plane speculum, neither real nor virtual.

The focus F, or *f*, of parallel rays, is called the solar focus; because in that the image of the sun is formed, and of all objects very remote. But the focus of any object situated near the mirrour will have its distance from the vertex more or less than half the radius; the rule in all cases being as follows:

Multiply the distance of the object into the radius of the mirrour, and divide the product by the sum of the radius and twice the distance of the object; the quotient will be the focal distance of a convex mirrour.

Again for a concave mirrour, the same product of the radius into the distance of the object, divided by the difference of radius and twice the distance of the object, will give the focal distance VF or V*f*. And here we are to observe, that, as twice the distance of the object, is lesser or greater than the radius, so the focus will be positive or negative, that is, behind the glass or before it.

The image of the object is formed in the focus proper to its distance: and, since the writers on optics demonstrate that the angles under which the object OB (*fig.* 9.) and its image IW are seen from the center or vertex of the mirrour C are always equal, it follows, that the image IW will be always in proportion to the object OB, as the focal distance VF to the object's distance GV. The position of the object will be always erect at a positive focus, or behind the speculum; diminished by a convex, and magnified by a concave one. Hence, since a convex has but one, *viz.* an affirmative focus, so it can never magnify any object, howsoever posited before it.

The position of the image in a negative focus, or that before the glass, will be ever inverted; and, if nearer the vertex than the center C, it will be less; if farther from it, it will be greater than the object; but in the center it will be equal to the object, and seem to touch it.

The image formed by a plane speculum is erect; large as the life; at the same apparent distance behind the glass as the object is before it; and on the same side of the glass with the object. Those properties render this sort of mirrour of most common use, *viz.* as a looking-glass.

If the rays fall directly, or nearly so, on a plane mirrour and the object be opake, there will be but one single image formed, or at least be visible; and that by the second surface of the speculum, and not by the first, through which the rays do most of them pass.

But if the object be luminous, and the rays fall very obliquely on the speculum, there will be more than one image formed, to an eye placed in a proper position to view them. The first image being formed by the first surface will not be so bright as the second, which is formed by the second surface. The third, fourth, &c. images, are produced by several reflexions of the rays between the two surfaces of the speculum; and, since some light is lost by each reflection, the images from the second will appear still more faint and obscure, to the eighth, ninth, or tenth, which can scarcely be discerned at all.

MISCHNAH, or Misnah, the code or collection of the civil law of the Jews.

MISDEMEANOR, in law, signifies a heinous offence or fault, particularly in the execution of an office.

MISEN, or Mizen, in a ship. See the article Mizen.

MISERERE Mei, in medicine, the name by which some call the illiac passion.

MISLETOE, *Viſcum*, in botany, a plant, which inſtead of rooting and growing in the earth like other plants, fixes itſelf and takes root on the branches of trees, ſpreading out in dichotomous branches ſo as to form a large buſh; the flowers come out from the wings of the ſtalk, and are male on ſome plants and female on others; they are both apetalous: the male flower conſiſts of a cup, formed of four oblong leaves, each having an oblong acuminated antheræ affixed to it: the female flower has a deciduous cup, formed of four ſmall oval leaves, ſitting on an oblong three-cornered germen, which becomes a ſmooth, round, unilocular berry, containing a fleſhy, compreſſed, heart-ſhaped ſeed.

Miſletoe grows more readily on the apple and aſh, and other ſmooth rind trees, than on others. It is ſuppoſed that the miſletoe-thruſh, which feeds on the berries of this plant in winter (at which time they are ripe) often carries the ſeeds from tree to tree, for the viſcous part of the berry which ſurrounds the ſeed, ſometimes ſticks faſt to the outer part of the bill of the bird, which to diſengage himſelf from, ſtrikes it againſt the branches of a neighbouring tree, and by that means, leaves the ſeed ſticking on the the bark, which will grow in the following winter; and it may be propagated by art in the ſame manner. Miſletoe is ſometimes found on the oak, though but rarely, which, perhaps, is the reaſon why that is valued more than others.

Miſletoe is eſteemed as a great anti-epileptic, and good in other nervous diſorders; the doſe of it in powder is from one dram to two. The berries purge upwards and downwards with great violence, and therefore are not proper to be given inwardly.

MISNOMER, in law, a miſnaming, or miſtaking a perſon's name.

MISPRISION, ſignifies, in general, ſome neglect or overſight; as where a perſon is privy to a treaſon or felony committed by another, and neglects to reveal it to the king or his council, or to a magiſtrate, but entirely conceals it: this is called miſpriſion of thoſe crimes.

MISSIONARIES, ſuch eccleſiaſtics as are ſent by any Chriſtian church, into pagan or infidel countries, to convert the natives, and eſtabliſh the Chriſtian religion among them.

MISUSER, in law, ſignifies ſome abuſe of any particular liberty or benefit. The charter of a corporation, as well as an office, may be forfeited by miſuſer.

MITCHELLA, in botany, a genus of the tetandria monogynia claſs of plants, the calyx of which conſiſts of two flowers, placed upon the germen; the corolla is monopetalous and funnel-ſhaped: the fruit is a bipartite globoſe berry: the ſeeds are compreſſed and callous.

MITE, a ſmall coin, formerly current, equal to about one-third part of a farthing.

It alſo denotes a ſmall weight, uſed by the moneyers: it is equal to the twentieth part of a grain, and is divided into twenty-four doits.

MITE, in zoology. See ACARUS.

MITELLA, in botany, a genus of the decandria digynia claſs of plants, the corolla whereof conſiſts of five patent petals, of an oblong figure, longer than the ſegments of the cup, with their ungues narrow, and inſerted into the calyx: the fruit is a capſule of a globoſe figure, but with a point formed of two valves, and opening between, containing only one cell: the ſeeds are numerous, and of a roundiſh oblong figure.

MITHRADATE, in pharmacy, a compound medicine in form of an electuary, ſerving either as a remedy or preſervative againſt poiſons; being alſo accounted a cordial, opiate, ſudorific, and alexipharmic.

MITRALES VALVULÆ, mitral valves, in anatomy, two valves ſituated in the left ventricle of the heart, at the ingreſs of the pulmonary vein, ſerving to hinder the ingreſs and regreſs of the blood from the heart into the veins again, while they are conſtricted.

MITRE, a ſacerdotal ornament, worn on the head by biſhops and certain abbots on ſolemn occaſions; being a ſort of cap, pointed and cleft at top.

MITTIMUS, as generally uſed, hath two ſignifications. 1. It ſignifies a writ for removing and transferring of records from one court to another. 2. It ſignifies a precept, or command in writing, under the hand and ſeal of a juſtice of the peace, directed to the gaoler or keeper of ſome priſon, for the receiving and ſafe-keeping of an offender charged with any crime until he be delivered by due courſe of law.

MIXT, or MIXED BODY, in philoſophy and chemiſtry, that which is compounded of different elements or principles; in which ſenſe, it ſtands contradiſtinguiſhed from ſimple or elementary, which is applied to bodies conſiſting of one principle only, as the chemiſts take ſulphur, ſalt, &c. to do. The buſineſs of chemiſtry is, to reſolve mixt bodies into their principles or component parts.

MIXT ACTION, in law, is an action, partly real and partly perſonal, which lies both for the thing detained, and againſt the perſon of the detainer. See ACTION.

MIXTURE, a compound, or aſſemblage of ſeveral different bodies in the ſame maſs.

MIXTURA SIMPLEX, a medicinal preparation made in the following manner: Take of the ſpiritus theriacalis camphoratus of Bates, ten ounces; ſpirit of vitriol, two ounces; rectified ſpirit of tartar, ſix ounces. Digeſt in a glaſs veſſel, hermetically ſealed, for three weeks. This medicine excites ſweat, reſiſts putrefaction, and is good in malignant fevers. The doſe is about a dram.

MIZEN, in the ſea-language, is a particular maſt

or ſail. The mizen-maſt ſtands in the ſternmoſt part of the ſhip. In ſome great ſhips there are two of theſe; when that next the main-maſt is called the main-mizen, and that next the poop, the bonaventure-mizen. The length of the mizen-maſt is, by ſome, accounted the ſame with the height of the main-top-maſt from the quarter-deck; or half the length of the main-maſt, and half as thick. The ſail which belongs to the mizen-maſt, is called the mizen-ſail: and when the word mizen is uſed at ſea, it always means the ſail. The uſe of the mizen is to keep the ſhip cloſe to the wind, or when a ſhip rides at anchor, to back her aſtern, ſo that ſhe may not foul her anchor, on the turning of the tide.

MNEMONIC, ſomething relating to the memory. See MEMORY.

MNIUM, in botany, a genus of moſſes, conſiſting of ſtalks furniſhed with leaves, and producing capſules raiſed on pedicles, like thoſe of the other moſſes of this claſs; but beſides theſe, there are other pedicles, bearing a kind of naked heads, with a duſty ſurface, and having no calyptræ. Theſe two kinds of heads are, in ſome ſpecies, produced on the ſame plant; and in others, on different plants of the ſame ſpecies. The pedicles that ſupport the capſules are long and naked; whereas thoſe ſupporting the duſty heads are ſhort, and in ſome ſpecies furniſhed with ſhort leaves.

MOAR-LOVRE, in huſbandry, a ſort of blight, which happens moſtly on light land, from the earth's ſinking away from the roots, ſo that the plants fall down to the earth.

To remedy this, they turn a ſhallow furrow againſt the rows, when they are ſtrong enough to bear it, and when the mould is fine and dry; for then, the motion of the ſtalks by the wind, will cauſe ſuch earth to run through the rows, and ſettle about the roots, and cover them.

MOARING, or MOORING, in the ſea-language. See the article MOORING.

MOAT, or DITCH, in fortification, a deep trench dug round the rampart of a fortified place, to prevent ſurprizes.

The brink of the moat, next the rampart, is called the ſcarpe; and the oppoſite one, the counter-ſcarpe.

MOBILE, or PRIMUM MOMILE, the ninth ſphere in the Ptolemaic Syſtem of Aſtronomy. See the article PTOLEMAIC.

MODE, *Modus*, in philoſophy, denotes the manner of a thing's exiſtence, which is twofold, viz. ſimple or mixed.

Simple modes are only combinations of the ſame ſimple idea: thus, by adding units together, in diſtinct ſeparate collections, we come by all the ſeveral modes of numbers, as a dozen, a ſcore, a thouſand, &c.

Mixed modes, on the contrary, are compounded of ſimple ideas of different kinds, as beauty, which conſiſts in a certain compoſition of colour and figure, cauſing delight in the beholder: ſuch alſo is theft, which is the concealed change of the poſſeſſion of a thing, without the conſent of the proprietor.

MODE, in muſic, is defined to be a particular manner of conſtituting the octave; or, it is the melodious conſtitution of the octave, as it conſiſts of ſeven eſſential ſounds, beſides the key or fundamental. See the article OCTAVE.

MODEL, in a general ſenſe, an original pattern, propoſed for any one to copy or imitate.

This word is particularly uſed, in building, for an artificial pattern made in wood, ſtone, plaſter, or other matter, with all its parts and proportions, in order for the better conducting and executing ſome great work, and to give an idea of the effect it will have in large. In all great buildings, it is much the ſureſt way to make a model in relievo, and not to truſt to bare deſign or draught. There are alſo models for the building of ſhips, and for extraordinary ſtair-caſes, &c.

They alſo uſe models in painting and ſculpture; whence, in the academies, they give the term model to a naked man or woman, diſpoſed in ſeveral poſtures to give an opportunity to the ſcholars to deſign him in various views and attitudes.

MODERATOR, in the ſchools, the perſon who preſides at a diſpute, or in a public aſſembly: thus, the preſident of the annual aſſembly of the church of Scotland, is ſtiled moderator.

MODERN, in a general ſenſe, ſomething new, or of our time, in oppoſition to what is antique or ancient.

MODIFICATION, in philoſophy, that which modifies a thing, or gives it this or that manner of being.

MODILLIONS, in architecture, ornaments in the corniche of the Ionic, Corinthian, and Compoſite columns.

The modillions are little inverted conſoles, or brackets, in form of an S, under the ſoffit of the corniche, ſeeming to ſupport the projecture of the larmier; though in reality they are no more than ornaments.

They ought always to be placed over the middle of the column. They are particularly affected in the Corinthian order, where they are uſually enriched with ſculpture. Their proportions ought to be ſo adjuſted, as to produce a regularity in the parts of the ſoffits. The intermodillions (i.e. the diſtances between them) depend on the inner columns, which oblige the modillions to be made of a certain length and breadth, in order to render the intervals perfect ſquares, which are always found to have better effects than parallelograms. To this it muſt be added, that in adjuſting the modillions, care

ſhould

ſhould be taken that they have ſuch a proportion as that when the orders are placed over one another, there be the ſame number in the upper order as in the lower, and that they fall perpendicular over one another.

MODIOLUS, in ſurgery, an inſtrument otherwiſe called a trepan. See TREPAN.

MODIUS, in antiquity, a kind of dry meaſure, in uſe among the Romans, for ſeveral ſorts of grain. See MEASURE.

MODO ET FORMA, *in manner and form*, among lawyers, are words of art, frequently uſed in pleadings, &c. and particularly in a defendant's anſwer, wherein he denies to have done what is laid to his charge in manner and form, as affirmed by the plantiff.

MODULATION, in muſic, the art of keeping in, or changing the mode or key. See the articles KEY and MODE.

Under this term is comprehended, the regular progreſſion of ſeveral parts, through the ſounds that are in the harmony of any particular key, as well as the proceeding naturally and regularly from one key to another; the rules of modulation, in the firſt ſenſe, belonging to harmony and melody. See the articles HARMONY and MELODY.

MODULE, in architecture, a certain meaſure or bigneſs, taken at pleaſure, for regulating the proportions of columns, and the ſymmetry or diſpoſition of the whole building.

Architects generally chooſe the ſemi-diameter of the bottom of the column for their module, and this they ſub-divide into parts or minutes. The module of Vignola, which is a ſemi-diameter, is divided into twelve parts in the Tuſcan and Doric, and into eighteen for the other orders.

The module of Palladio, Scamozzi, M. Cambray, Deſgodetz, Le Clerk, &c. (which is alſo equal to the ſemi-diameter) is divided into thirty parts or minutes in all the orders.

The whole height of the column is divided, by ſome, into twenty parts for the Doric, twenty-two and a half for the Ionic, twenty-five for the Roman, &c. and one of theſe parts is made a module, to regulate the reſt of the building.

MODUS DECIMANDI, in law, is where money, land, or other valuable conſideration, has been given, time out of mind, to the miniſter or parſon of any certain place in the room of tithes.

A clergyman may ſue in a ſpiritual court for a modus decimandi; yet if the modus is denied there, or a cuſtom is to be tried, the trial thereof belongs to the courts of common law. When lands are converted to other uſes, as in the caſe of hay-ground turned into tillage, the modus may be diſcharged, and the tithes paid again in kind.

MOEDORE, or MOIDORE. See the article MOIDORE.

MOHERINGIA, moſſy-chickweed, in botany, a genus of the octandria-digynia claſs of plants, the flower of which is compoſed of four ſhort undivided petals; and its fruit is a ſubgloboſe capſule, with one cell, in which are contained numerous roundiſh ſeeds.

It is called by ſome, alſine muſcoſa.

MOGULS, or MONGULS, hoards or tribes of vagrant Tartars, on the north of India, from whom the moguls or ſovereigns of India, as well as of the Uſbec-Tartars, are deſcended.

MOHAIR, in commerce, the hair of a kind of goat, frequent about Angoura, in Turky; the inhabitants of which city are all employed in the manufactures of camblets, made of this hair.

MOHAIR-SHELL, in natural hiſtory, a ſpecies of voluta. See VOLUTA.

MOIDORE, or MOEDORE, a Portugueſe gold coin. See EXCHANGE.

MOIETY, *medietas*, the half of any thing. See MEDIETAS.

MOINEAU, in fortification, is a flat baſtion raiſed between two other baſtions, when a re-entering angle before a curtain is too long.

The moineau is commonly joined to the curtain, but it is ſometimes ſeparated from it by a foſs, in which caſe it is called a detached baſtion. The moineau is not raiſed ſo high as the works of the place, becauſe it ought to be expoſed to the fire of the place, in caſe the enemy ſhould lodge themſelves in it.

MOISTURE, a term ſometimes uſed to denote animal fluids, the juices of plants, or dampneſs of the air, or other bodies.

Radical MOISTURE, among phyſicians, ſignifies a vital fluid, which nouriſhes and maintains life, as oil does a lamp. However, Dr. Quincy obſerves, that ſuch a fluid is a mere chimera, unleſs we thereby mean the maſs of blood. See BLOOD.

MOLA, in anatomy, the ſame with patella. See PATELLA.

MOLA, the ſun-fiſh, in ichthyology, a ſpecies of oſtracion, of a compreſſed roundiſh figure, with four holes on the head.

This is a very ſingular fiſh, weighing often more than an hundred pounds: its figure, at firſt ſight, more reſembles the head of ſome large fiſh, cut off from the body, than that of a complete animal.

MOLA, a mole, in medicine. See the article MOLE.

MOLARES, or DENTES MOLARES, in anatomy, the large teeth, called in Engliſh, grinders. See the article TOOTH.

MOLE, *talpa*, in zoology, makes a genus of quadrupeds, of the order of the feræ, thus characterized: the feet are formed like hands, and calculated for digging; and it has no external ears.

MOLE-CRICKET, the ſame with gryllo talpa. See GRYLLO TALPA.

MOLE, *mola Carnea*, in medicine, a maſs of fleſhy

fleſhy matter, of a ſpherical figure, generated in the uterus, or womb, and ſometimes miſtaken for a child. Its ſize is various, from that of a large nut to that of a fœtus. Some moles are ſoft and ſpungy, and others membranous, with a cavity in the middle. Sometimes they are filled with ſerous matter, and ſometimes with hydatides.

MOLE, *Moles*, is a maſſive work of large ſtones laid in the ſea by means of cofferdams, extending before a port, either to defend the harbour from the impetuoſity of the waves, or to prevent the paſſage of ſhips without leave.

MOLINE, or CROSS-MOULIN, in heraldry, the ſame with that called Fer de moulin. See FER DE MOULIN.

MOLLUGO, baſtard-madder, in botany, a plant of the triandria-trigynia claſs, without any flower petals. Its fruit is a capſule of a ſomewhat oval figure, with three cells, in each of which there is a number of kidney-ſhaped ſeeds.

It is ſaid to have the ſame medicinal virtues as madder.

MOLOSSES, in commerce, the thick fluid matter remaining after the ſugar is made, reſembling ſyrup. See SUGAR.

MOLOSSUS, in Greek and Latin poetry, a foot compoſed of three long ſyllables, as *delectant*.

MOLTA, or MOLTURA, a toll or duty formerly paid by vaſſals to their lord, for grinding their corn in his mill.

MOLTING, the change of feathers, hairs, or horns, in birds and beaſts.

MOLUCCA-BEANS, *Moluccella*, in botany, a genus of plants, the flower of which is monopetalous and labiated; the upper-lip being entire, and the lower one trifid: the ſeeds are turbinated, and contained in the bottom of the cup.

MOMENT, in the doctrine of time, an inſtant, or the moſt minute and indiviſible part of duration. See TIME.

Strictly ſpeaking, however, a moment ought not to be conſidered as any part of time, but only as the termination or limit thereof.

MOMENT, in the doctrine of infinites, denotes the ſame with infiniteſimal. See the article INFINITESIMAL.

MOMENTUM, in mechanics, ſignifies the ſame with impetus, or the quantity of motion in a moving body; which is always equal to the quantity of matter, multiplied into the velocity; or, which is the ſame thing, it may be conſidered as a rectangle under the quantity of matter and velocity. See MOTION.

MONADELPHIA, in botany, a claſs of plants, the ſixteenth in order, ſo called becauſe the ſtamina of the flowers are ſo interwoven as to form one body; or rather, becauſe the ſtamina are connected, or coaleſce at the baſe.

MONANDRIA, in botany, a claſs of plants, the firſt in order, with only one ſtamen, or male part in each flower.

The monandria are ſubdived into two orders, which are denominated monandria-monogynia, and monandria-digynia, according as they contain one or two ſtyles.

MONARDIA, in botany, a genus of plants, with a monopetalous flower, the rim of which is ringent: the ſeeds are four in number, roundiſh, and contained in the bottom of the cup.

MONASTERY, a convent, or houſe built for the reception and entertainment of monks, mendicant friars, or nuns, whether it be an abbey, priory, &c.

MONASTIC, ſomething belonging to monks. See MONKS.

MONDAY, *Dies Lunæ*, the ſecond day of the week, ſo called as being anciently ſacred to the moon, q. d. moon-day.

MONEY, *Moneta*, a piece of matter, commonly metal, to which public authority has affixed a certain value and weight to ſerve as a medium in commerce.

Money is uſually divided into real and imaginary. Real money includes all coins, whether gold, ſilver, copper, or the like; ſuch as guineas, crowns, piſtoles, pieces of eight, ducats, &c.

Imaginary money, or money of account, is that which has never exiſted, or, at leaſt, which does not exiſt in real ſpecies; but is a denomination invented or retained to facilitate the ſtating of accounts, by keeping them ſtill on a fixed footing, not to be changed like current coins, which the authority of the ſovereigns ſometimes raiſes or lowers, according to the exigencies of the ſtate, of which kinds are pounds, livres, marks, maravedes, &c.

MONEYERS, MONEYORS, or MONIERS, officers of the mint, who work and coin gold and ſilver money, and anſwer all waſte and charges.

MONITORY LETTERS, are letters of warning and admonition, ſent from an eccleſiaſtical judge, upon information of ſcandals and abuſes, within the cognizance of his court.

MONK, a perſon who wholly dedicates himſelf to the ſervice of religion, in ſome monaſtery, under the direction of ſome particular ſtatutes and rules.

The moſt probable account of the origin of the monks is, that in the decian perſecution, in the middle of the third century, many perſons in Egypt, to avoid the fury of the ſtorm, fled to the neighbouring deſerts and mountains, where they not only found a ſafe retreat, but alſo more time and liberty to exerciſe themſelves in acts of piety and divine contemplations; which ſort of life became ſo agreeable, that when the perſecution was over, they refuſed to return to their habitations again, chooſing rather to continue in thoſe cottages and cells, which

they had made for themſelves in the wilderneſs. From that time to the reign of Conſtantine, monachiſm was confined to the hermits or anachorets, who lived in private cells in the wilderneſs: but when Pachomius had erected monaſteries, other countries preſently followed the example.

The manner of admiſſion to the monaſtic life was uſually by ſome change of habit, not to ſignify any religious myſtery, but only to expreſs their gravity and contempt of the world. Long hair was always thought an indecency in men, and ſavouring of ſecular vanity, and therefore they polled every monk at his admiſſion, to diſtinguiſh him from ſeculars; but they never ſhaved them, leſt they ſhould look like the prieſts of Iſis. St. Jerome, ſpeaking of the habits of the monks, intimates that it differed from that of others only in this, that it was cheaper, coarſer, and meaner raiment. We read of no ſolemn vow, or profeſſion, required at their admiſſion; but they underwent a triennial probation, during which time they were inured to the exerciſes of the monaſtic life. If, after that time was expired, they choſe to continue the ſame exerciſes, they were then admitted, without any farther ceremony, into the community. As the monaſteries had no ſtanding revenues, all the monks were obliged to maintain themſelves by their daily labour: they had no idle mendicants among them, but looked upon a monk who did not work, as a covetous defrauder. Every ten monks were ſubject to one, who was called decanus, or dean, from his preſiding over ten; and every hundred had another officer called centenarius, from his preſiding over an hundred; and above theſe were the fathers of the monaſteries, alſo called abbots. The buſineſs of the deans was to exact every man's daily taſk, and carry it to the ſteward, who gave a monthly account of it to the abbot.

MONK-SEAM, among ſailors, is the ſewing the edges or ſelvedges of ſails together, over one another on both ſides, to make it the ſtronger.

MONKEY, *Simia*, in zoology, a numerous genus of quadrupeds of the order of the anthropomorpha, or quadrupeds that reſemble the human figure: their face is naked; the claws are roundiſh and flattiſh, in ſome degree like the nails on the human hand; and they have both an upper and lower eyelid.

MONOCHORD, a muſical inſtrument, compoſed of one ſtring, uſed to try the variety and proportion of ſounds.

It is formed of a rule, divided and ſubdivided into ſeveral parts, on which there is a moveable ſtring ſtretched upon two bridges, at each extreme. In the middle between theſe is a moveable bridge, by means of which, in applying it to the different diviſions of the line, the ſounds are found to bear the ſame proportion to each other, as the diviſions of the line, cut by the bridge. There are alſo monochords with forty-eight fixed bridges.

The monochord is alſo called the harmonical canon, or the canonical rule, becauſe it ſerves to meaſure the degrees of gravity or acuteneſs.

Monochord is alſo uſed for any muſical inſtrument, that conſiſts of only one ſtring or chord; in this ſenſe the trumpet-marine may properly be called a monochord.

MONOCULUS, in zoology, a genus of cruſtaceous water-inſects of the aptera-order, the body of which is ſhort, roundiſh, and covered with a firm cruſtaceous ſkin; its fore legs are ramoſe, and ſerve for leaping and ſwimming: and it has only one eye, compoſed of three ſmaller ones.

MONODON, in ichthyology, a fiſh of the whale-kind, otherwiſe called narwal, or the ſea-unicorn.

MONODY, in ancient poetry, a mournful kind of ſong, ſung by a perſon all alone, to give vent to his grief.

MONOECIA, in botany, one of Linnæus's claſſes of plants, the twenty-firſt in order; in which the male and female flowers are placed ſeparately on the ſame plant, or rather on different ſtalks growing from the ſame root.

Of the plants belonging to this claſs, ſome have only one ſtamen, and others have three, four, five, ſix, or more ſtamina; whence the ſubordinate orders of monoecia-monandria, monoecia-triandria, &c. others again are monadelphous, others ſyngeneſious, and others gynandrous.

MONOGRAM, a character or cypher, compoſed of one, two, or more letters, interwoven; being a kind of abbreviation of a name, antiently uſed as a ſeal, badge, arms, &c.

MONOLOGUE, in poetry, a dramatic ſcene, in which a perſon appears alone on the ſtage, and ſpeaks to himſelf.

MONOMIAL, in algebra, a root or quantity that has but one name, or conſiſts of only one member, as $a\,b$, $a\,a\,b$, &c.

MONOPETALOUS, in botany, a term applied to flowers that have only one petal, or flower-leaf.

MONOPOLY, one or more perſons making themſelves the ſole maſters of the whole of a commodity, manufacture, and the like, in order to make private advantage of it, by ſelling it again at a very advanced price.

MONOPTERE, in architecture, a kind of temple, round, and without walls, having a dome ſupported by columns.

MONOPTOTON, in grammar, a noun that has only one caſe, as *inficias*.

MONOPYRENEOUS, in botany, ſuch fruit as contains only one ſeed, or kernel.

MONORHYME, a piece of poetry, in which all the verſes end with the ſame rhyme.

MONOSTICH, an epigram that conſiſts of only one ſingle verſe.

MONOSYLLABLE, in grammar, a word that conſiſts of only one ſyllable, and is compoſed of either one or more letters pronounced at the ſame time.

MONOTHELITES, a ſect of Chriſtians in the ſeventh century, ſo called from their maintaining, that though there were two natures in Jeſus Chriſt, the human and divine, there was but one will, which was the divine.

MONOTONY, an uniformity of ſound, or a fault in pronunciation, when a long ſeries of words are delivered in one unvaried tone.

MONOTROPA, in botany, a genus of plants, the flower of which conſiſts of ten oblong deciduous petals, ſerrated at the tops: the fruit is an oval, pentagonal, obtuſe capſule, containing a great number of paleaceous ſeeds.

This genus comprehends the orobanchoides of Tournefort, and the hypopitys of Dillenius.

MONSOON, in phyſiology, a ſpecies of trade-wind, in the Eaſt-Indies, which for ſix months blows conſtantly the ſame way, and contrary the other ſix. See WIND.

MONTH, *Menſis*, in chronology, the twelfth part of a year.

Time being duration, marked out for certain uſes, and meaſured by the motion of the heavenly bodies, there thence reſults divers kinds of months as well as years different from one another according to the particular luminary by whoſe revolution they are determined, and the particular purpoſes they are deſtined for: hence months are of two kinds, aſtronomical and civil.

An aſtronomical month is that which is governed either by the motion of the ſun or moon, and is conſequently of two kinds, ſolar and lunar: a ſolar month is that time, in which the ſun ſeems to run through a whole ſign, or, the twelfth part of the ecliptic.

Hence, if regard be had to the ſun's true apparent motion, the ſolar month will be unequal, ſince the ſun is longer in paſſing through the winter-ſigns than through thoſe of the ſummer; but as he conſtantly travels through all the twelve ſigns in 365 days, 5 hours and 49 minutes the quantity of a mean month will be had, by dividing that number by 12; on this principle, the quantity of a ſolar month will be found to be 30 days, 10 hours, 29 minutes, 5 ſeconds. See EARTH.

A lunar month is that ſpace of time which the moon takes up in performing its courſe through the zodiac, or that meaſured by the motion of the moon round the earth; and is of three kinds, *viz.* periodical, ſynodical, and that of illumination. The lunar periodical month, is the ſpace of time wherein the moon makes her round through the zodiac, or wherein ſhe returns to the ſame point, being 27 days, 7 hours, 43 minutes, 5 ſeconds. See the article MOON.

The lunar ſynodical month, called alſo abſolutely the lunar month and lunation, is the ſpace of time between two conjunctions of the moon with the ſun; or the time it takes from one conjunction with the ſun to the next; or from one new moon to another: the quantity of a ſynodical month is 29 days, 12 hours, 44 minutes, 3 ſeconds, and 11 thirds. The quantity of a ſynodical month is not the ſame at all times, for in the ſummer ſolſtice, when the ſun ſeems to move ſloweſt, the ſynodical month appeareth leſs, being about 29 days, 6 hours, 42 minutes; but in the winter, when the ſun's motion ſeems faſter, the moon does not fetch up the ſun ſo ſoon, for which reaſon the ſynodical month then ſeems greater, *viz.* 29 days, 19 hours, and 37 minutes, according to the obſervation of the ſame aſtronomers: ſo that the firſt quantity given of the ſynodical month, is to be underſtood as to the mean motion. From what has been ſaid, it may eaſily appear that the difference between a periodical and ſynodical month is this: the firſt is called periodical in reſpect of the moon's orbit; but the ſynodical is ſo called in reſpect of its connection with the other luminery.

Now after the time of its conjunction, the ſun does not continue in the ſame place of the zodiac, but moves forwards to the eaſt, upon which it falls out that the moon, finiſhing its courſe does not find the ſun again in the ſame place where it left him, he being removed almoſt a whole ſign from his former place, ſo that to overtake the ſun again, it plainly appears that a certain ſpace of time is requiſite beſides the periodical, which makes up the ſynodical month.

The ancient Romans made uſe of the lunar months, and made them alternately of 29 and 30 days; and they marked the days of each month by three terms, *viz.* calends, nones, and ides. See the articles CALENDS, *&c.*

The lunar month of illumination, or appoſition, or illuminative month, is the ſpace from the firſt time of the moon's appearance after new moon, to her firſt appearance after the new moon following. The lunar month of illumination, is not of any determined quantity, becauſe the moon appears ſometimes ſooner, and ſomtimes later, after the conjunction; for which diverſity aſtronomers give us ſeveral reaſons, particularly the obliquity of the zodiac, the variable latitude of the moon, the apparent inequality of its motion, the different qualities of the ſummer and winter-air, *&c.* By this month, however, the Turks and Arabs go; and it is ſaid that the antient Britons went by the phaſes of the moon.

A civil or political month, conſiſts of a certain number of days, according to the laws and cuſtoms of the different countries wherein it is uſed, either having no regard to the ſolar or lunar months, as thoſe of the Egyptians in their equal year, of the

Romans in the year of Romulus, &c. or coming pretty near to the ſolar aſtronomical month, as the Julian; or elſe the lunar aſtronomical, as the Jewiſh, Turkiſh, and others. The Britiſh, and moſt European nations, make 12 months in the year, viz. January, February, &c.

Civil ſolar months, are ſuch civil months as are accommodated to the aſtronomical months, or thoſe which are to conſiſt alternately of 30 and 31 days, excepting one month of the twelve, which, for every fourth year, conſiſted of 30 days, and for the other years of 29. This form of civil months was introduced by Julius Cæſar; but under Auguſtus, the ſixth month, till then, from its place, called Sextilis, was denominated Auguſtus, in honour of that prince; and to make the compliment yet the greater, a day was added to it, ſo that now it conſiſts of 31 days, though till then it had only 30; to make up for which, a day was taken from February, ſo that from thenceforward it only conſiſted of 28 days, and every fourth year of 29; though before it had ordinarily conſiſted of 29 days, *&c.* and ſuch are the civil or calendar months which now obtain throughout Europe.

Civil lunar months are to conſiſt alternately of 29 and 30 days: thus will two civil months be equal to two aſtronomical ones, abating for the odd minutes, and conſequently the new moon will be hereby kept to the firſt day of each ſuch civil month, for a long time together. However, to make them keep conſtantly pace with the civil months, at the end of each 948 months, a month of 29 days muſt be added; or elſe, every 33d month muſt conſiſt of 30 days. This was the month in civil or common uſe among the Jews, Greeks, and Romans, till the time of Julius Cæſar.

Philoſophical MONTH, among chemiſts, is the ſpace of 40 days and nights.

MONTIA, blinks, in the Linnean ſyſtem of botany, a genus of the triandria-tryginia claſs of plants, the corolla whereof conſiſts of a ſingle petal, and is divided at the extremity into five parts; three of the ſegments are ſmaller than the others, and produce ſtamina; theſe ſtand alternately with the two larger: the fruit is a turbinated obtuſe capſule, covered by the cup, compoſed of three valves, and having three cells: the ſeeds are three in number, and roundiſh.

MONUMENT, in architecture, a building deſtined to preſerve the memory, &c. of the perſon who raiſed it, or for whom it was raiſed; ſuch are a triumphal arch, a mauſoleum, a pyramid, &c.

MOOD, or MODE, called alſo ſyllogiſtic mood, a proper diſpoſition of the ſeveral propoſitions of a ſyllogiſm, in reſpect of quantity and quality.

MOOD, or MODE, in grammar, the different manner of conjugating verbs, ſerving to denote the different affections of the mind.

Hence ariſe four moods, viz. the indicative, ſubjunctive, and imperative: of theſe, the three firſt are called finite moods, becauſe they define a certain perſon and number; but the fourth is called the infinitive, becauſe in it there is no diſtinction of either perſon or number.

MOON, *Luna*, ☽, in aſtronomy, a ſatellite, or ſecondary planet, always attendant on our earth.

Of the ſix primary planets, we find but three that are certainly attended with moons, viz. the earth, Jupiter, and Saturn; for though Mr. Short has given an account of a phænomenon that he obſerved ſome years ago, which ſeems extremely like a moon about Venus, yet, as it was never obſerved before nor ſince, through the beſt of teleſcopes, it does not appear to be a moon. See JUPITER, EARTH, and SATURN.

Aſtronomers have drawn the face of the moon, according as it is ſeen with the beſt teleſcopes; for which we are obliged to the accurate labours of the famous ſelenographers Florentius, Langrenus, John Hevelius of Dantzic, Grimaldus and Ricciolus, Italians; who have taken particular care to note all the ſhining parts of the moon's face, and, for the better diſtinguiſhing them, they have given to each part a proper name. Langrenus and Ricciolus have divided the lunar regions among the philoſophers and aſtronomers, and other eminent men; but Hevelius, fearing leſt the philoſophers ſhould quarrel about the diviſions of the lands, has ſpoiled them of this their property, and given the parts of the moon thoſe geographical names that belong to the different iſlands, countries, and ſeas, that belong to our earth, without any regard to their ſituation or figure.

That the ſurface of the moon is not ſmooth or even, but diverſified with hills and vales, continents and ſeas, lakes, &c. any one would imagine, who views her face through a large teleſcope. That ſhe has variety of hills and mountains is demonſtrable from the line which bounds the light and dark parts not being an even and regular curve, as it would be upon a ſmooth ſpherical ſurface, but an irregular broken line, full of dents and notches.

Alſo becauſe ſome ſmall (and many large) bright ſpots appear in the dark portion, ſtanding out at ſeveral diſtances from the boundary line; which ſpots in a few hours become larger, and at laſt unite with the enlightened portion of the diſk.

On the other hand, we obſerve many ſmall ſpots interſperſed all over the bright part, ſome of which have their dark ſides next the ſun, and their oppoſite ſides very bright and circular, which infallibly proves them to be deep, hollow, round cavities; of which there are two very remarkable ones near together on the upper part, and may be viewed exceedingly plain, when the moon is about four or five days old. The depth of theſe lunar cavities prodigiouſly exceeds the height of the mountains, and

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consequently the surface of the moon has but little resemblance to that of the earth in these respects.

Since, then, the moon's surface appears to be so very mountainous and irregular, it has been a question, how it comes to pass that the bright circular limb of the disk does not appear jagged and irregular, as well as the curve bounding the light and dark parts: in answer to this, it must be considered that, if the surface of the moon had but one row of mountains placed round the limb of the disk, the said bright limb would then appear irregularly indented; but since the surface is all over mountainous, and since the visible limb is to be considered not as a single curve line, but a large zone, having many mountains one behind another, from the observer's eye, it is evident the mountains in some rows being opposite to the vales in others, will fill up the inequalities in the visible limb in the remoter parts, which diminish to the sight and blend with each other, so as to constitute, like the waves of the sea, one uniform and even horizon. Whether there be seas, lakes, &c. in the moon, has been a question long debated, but now concluded in the negative: for in those large, darker regions, which were thought to be seas, we view, through a good telescope, many permanent bright spots, as also caverns and empty pits, whose shadows fall within them, which can never be seen in seas or any liquid substance. Their dark and dusky colour may proceed from a kind of matter or soil, which reflects light less than that of the other regions. These spots have continued always the same unchangeably, since they were first viewed with a telescope; though less alterations than what happen in the earth, in every season of the year, by verdure, snow, inundations, and the like, would have caused a change in their appearance. But indeed as there are no seas nor rivers in the moon, and no atmosphere, so of course there can be no clouds, rain, snow, or other meteors, whence such changes might be expected.

Sir Isaac Newton mentions an atmosphere about the moon, but other astronomers think there is reason (not to say a demonstration) for the contrary: for where there an atmosphere of air like ours, it must necessarily obscure the fixed stars in the moon's appulse to them: but it has been observed that this never happens: on the contrary, they preserve all their splendor to the moment of their occultation, and then disappear instantaneously, and in the same manner they recover their light, when they appear again on the other side.

The distance of our moon from the earth is determined by her horizontal parallax, or the angle which the semidiameter of the earth subtends at the moon, viz. the angle A O C (Plate LXXII. *fig.* 1.) which is the difference between the true place of the moon's center O, when in the horizon, and the apparent place thereof, as viewed from the surface of the earth at A. The former is known by astronomical tables, the latter by observation: and the quantity of this difference, or angle, at a mean, is $57' 12'' = AOC$.

If therefore we say, as the tangent of $57' 12''$ is to radius, so is $AC = 1$ to $CO = 60{,}1$; this will be the mean distance of the moon in semidiameters of the earth. Therefore, since one semidiameter of the earth contains 3982 miles, we have $3982 \times 60{,}1 = 239318{,}2 = CO$, the mean distance of the moon.

The moon's apparent semidiameter M O measures, at her mean distance, $15' 38'' = 938''$ by the micrometer, which is the quantity of the angle M C O. The earth's diameter, therefore, is to the moon's, as $3432''$ to $938''$; that is, as 109 to 30, or, as 3,63 to 1. Wherefore $\frac{30}{109} \times 7964 = 2192$ miles the moon's diameter.

Therefore the face of the earth, as it appears to the lunarians, is to the face of the moon, as it appears to us, as 109×109 to 30×30, *viz.* as 11881 to 900, or as 12,2 to 1. And the real bulk of the earth is to that of the moon as $109 \times 109 \times 109$ to $30 \times 30 \times 30$, viz. as 1295029 to 27000, that is, as 1295 to 27, or as 48 to 1 very nearly.

Since, as we have shewn, the mean distance of the moon is about 60 semidiameters of the earth, at the distance of the moon one degree of the earth's surface will subtend an angle of one minute, and will therefore be visible; but such a degree is equal to $69\frac{1}{2}$ miles; therefore a spot or place 70 miles in diameter, in the moon, will be just visible to the naked eye. Hence a telescope that magnifies about 100 times, will just discover a spot whose diameter is $\frac{1}{100}$ of 70 miles, or $\frac{7}{10}$ of a mile of 3698 feet: and a telescope that will magnify 1000 times, will shew an object that is but $\frac{7}{1000}$ of a mile, that is, whose diameter is but 370 feet, or little more than 120 yards; and therefore will easily shew a small town or village, or even a gentleman's seat, if any such there be.

The time which the moon takes up in making one revolution about the earth, from a fixed star to the same again, is 27d. 7 h. 43′, which is called the periodical month. But the time that passes between two conjunctions, that is, from one new moon to another, is equal to 29d. 12h. 44′ 3″, which is called a synodical month: for, after one revolution is finished, the moon has a small arch to describe to get between the sun and the earth, because the sun keeps advancing forward in the ecliptic. Now this surplus of motion takes up 2 d. 5 h. 1′ 3″, which added to the periodical month, makes the synodical, according to the mean motions.

The moon moves about its own axis in the same time that it moves about the earth, from whence it comes to pass that she always shews the same face to us: for by this motion about her axis, just so much

much of her ſurface is turned towards us conſtantly, as by her motion about the earth would be turned from us.

But ſince this motion about the axis is equable and uniform, and that about the earth, or common center of gravity, is unequal and irregular, as being performed in an ellipſis, it muſt follow that the ſame part of the moon's ſurface, preciſely, can never be ſhewn conſtantly to the earth; and this is confirmed by the teleſcope, through which we often obſerve a little gore or ſegment on the eaſtern and weſtern limb appear and diſappear by turns, as if her body librated to and fro; which therefore occaſioned this phænomenon to be called the moon's libration. The orbit of the moon is elliptical, more ſo than any of the planets, and is perpetually changing and variable, both in reſpect of its figure and ſituation; of which we ſhall treat more largely further on. The inclination of the moon's orbit to the plane of the ecliptic is alſo variable, from 5° to 5° 18′. The line of the nodes likewiſe has a variable motion from eaſt to weſt, contrary to the order of the ſigns, and completes an entire revolution in a ſpace of time a little leſs than nineteen years. Alſo the line of the apſides, or of the apogee and perigee, has a direct motion from weſt to eaſt, and finiſhes a revolution in the ſpace of about nineteen years. All which will be more copiouſly treated of, when we come to explain the phyſical cauſes thereof.

The phaſes of the moon in every part of the orbit, are eaſily accounted for from her different ſituation with reſpect to the earth and ſun: for, tho' to an eye placed in the ſun ſhe will always exhibit a complete illuminated hemiſphere, yet in reſpect to the earth, where the hemiſphere is viewed in all degrees of obliquity, it will appear in every degree from the greateſt to the leaſt; ſo that at E (*fig.* 2 and 3.) no part at all of the enlightened ſurface can be ſeen. At D, a little part of it is turned towards the earth, and from its figure it is then ſaid to be horned. At C, one half of the enlightened ſurface is turned to the earth, and ſhe is then ſaid to be dichotomiſed, and in her firſt quarter or quadrature. At B, a part more than half is turned to the earth, and then ſhe is ſaid to be gibbous. At A, her whole illuminated hemiſphere is ſeen, being then in oppoſition to the ſun; and this is called the full moon. At H, ſhe is again gibbous, but on the other part: at G ſhe is again dichotomiſed, and in her laſt quarter: at F ſhe is horned, as before; and then becomes new again at E, where ſhe is in conjunction with the ſun.

If M N be drawn perpendicular to the line S L joining the centers of the ſun and moon, and O P perpendicular to the line T L joining the centers of the earth and moon, it is evident that the angle P L N in the firſt half of the orbit, and O L M in the ſecond, will be proportional to the quantity of the illuminated diſk turned towards the earth; and this angle is every where equal to the angle E T L, which is called the elongation of the moon from the ſun.

To find what quantity of the moon's viſible ſurface is illuſtrated for any given time, we are to conſider that the circle of illumination B F C, (*fig.* 4.) is oblique to the view every where, but at E and A; and therefore by the laws of the orthographic projection, it will be projected into an ellipſe whoſe longeſt axis is the diameter of the moon B C, and the ſemi-conjugate is F L = coſine of the angle of elongation F B P. Hence F P = verſed ſine of the ſaid angle. But from the nature of the circle and ellipſe, we have L P in a conſtant ratio to F P, wherever the line O P is drawn perpendicular to B; therefore alſo 2 L P = P O has a conſtant ratio to F P. But (by Euclid V. 12.) the ſum of all the lines O P = area of the circle is to the ſum of all the lines F P = area of the illuminated part, as the diameter of the circle O P to the verſed ſine of the elongation F P.

As the moon illuminates the earth by a reflex light, ſo does the earth the moon; but the other phænomena will be different for the moſt part. 1. The earth will be viſible but to little more than one half of the lunar inhabitants. 2. To thoſe who ſee it, the earth appears fixed, or at leaſt to have no circular motion, but only that which reſults from the moon's libration. 3. Thoſe who live in the middle of the moon's viſible hemiſphere, ſee the earth directly over their heads. 4. To thoſe who live in the extremity of that hemiſphere, the earth ſeems always nearly in the horizon, but not exactly there, by reaſon of the libration. 5. The earth, in the circle of a month, would have all the ſame phaſes as the moon has. Thus the lunarians, when the moon is at E, in the middle of their night, ſee the earth at full, or ſhining with a full face; at C and G it is dichotomiſed, or half light and half dark; at A it is wholly dark, or new; and at the parts between theſe it is gibbous. 6. The earth appears variegated with ſpots of different magnitudes and colours, ariſing from the continents, iſlands, oceans, ſeas, clouds, &c. 7. Theſe ſpots will appear conſtantly revolving about the earth's axis, by which the lunarians will determine the earth's diurnal rotation, in the ſame manner as we do that of the ſun.

MOOR, in country affairs, denotes an unlimited tract of land, uſually over-run with heath.

MOOR-BUZZARD, the Engliſh name of the yellow-legged falcon, with an iron-coloured body and yellow head.

It is about the ſize of the common crow, and has its Engliſh name from building its neſt in mooriſh and boggy places.

MOOR-COCK, or GOR-COCK, a ſpecies of tetrao, with a forked tail, ſpotted with white underneath. It is a native of England, but very rare: the

the male is throughout of a very deep iron grey, without any variegation; and the female is likewiſe grey, but variegated with tranſverſe lines of black.

MOORING, or MOARING, in the ſea language, is the laying out the anchors of a ſhip in a place where ſhe can ride ſecure.

Mooring acroſs, is laying out an anchor on each ſide: and mooring along, is to have an anchor in a river, and a hawſer on ſhore.

When ſhips are laid up in ordinary, or are under orders of fitting for the ſea, the moorings are laid out in harbours; and conſiſt of claws, pendant chains, cables, bridles, anchors, ſwivels, jews-harps, buoys, and chains.

MOOT, a difficult caſe argued by the young barriſters and ſtudents at the inns of court, by way of exerciſe, the better to qualify them for practice, and to defend the cauſes of their clients.

MORAL, ſomething belonging to manners, or the conduct of life.

MORAL PHILOSOPHY, the ſame with ethics. See ETHICS.

MORAL SENSE, that whereby we perceive what is good, virtuous, and beautiful in actions, manners, and characters.

MORALITY, the ſcience and doctrine of morals, otherwiſe called ethics. See ETHICS.

MORASSE, a low, moiſt land, which receives the waters from the higher grounds without having any deſcent to carry them off.

MORBID, among phyſicians, ſignifies diſeaſed or corrupt; a term applied either to an unſound conſtitution, or to to thoſe parts or humours that are infected by a diſeaſe.

MORBILLI, the meaſles, in medicine. See MEASLES.

MORESK, or MORISCO, is a kind of painting, carving, &c. done after the manner of the moors; conſiſting of ſeveral groteſque pieces and compartments, promiſcuouſly mingled, not containing any perfect figure of a man, or other animal; but a wild reſemblance of birds, beaſts, trees, &c.

MORESK-DANCES, vulgarly called morrice-dances, are thoſe altogether in imitation of the moors, as ſarabands, chacons, &c. which are generally performed with caſtenets or tambours.

MORINA, in botany, a plant of the diandria-monogynia claſs, with a monopetalous flower, bilabiated at the limb: the ſeed is ſingle, roundiſh, and coronated with the cup of the flower.

MORINDA, in botany, a genus of the pentandria-monogynia claſs of plants, with an infundibuliform monopetalous flower, divided into five ſegments at the limb: the fruit is a roundiſh berry, with an umbilicated point, and contains two elliptico-hemiſpherical ſeeds.

MORISONA, in botany, a genus of plants, the flower of which conſiſts of four oblong petals: the fruit is a globoſe berry, containing a great many kidney-ſhaped ſeeds.

MORNING, the beginning of the day, the firſt appearance of light, or the time from midnight till noon.

MOROCCO, *Marroquin*, in commerce, a fine kind of leather, prepared of the ſkin of an animal of the goat kind, and imported from the Levant, Barbary, &c.

MORPHEW, a leprous kind of ſcurf, which ſometimes breaks out upon the ſkin, particularly about the forehead. See LEPROSY.

MORSE, in zoology, a name by which ſome call the hippopotamus. See the article HIPPOPOTAMUS.

MORTALITY, or *Bills of* MORTALITY, properly denote weekly liſts of the perſons who die in any place.

In London, theſe bills are drawn up by the company of pariſh clerks, and contain an account of the numbers, ages, diſeaſes, &c. of ſuch as die within the bills of mortallity; that is, in London, Weſtminſter, and ten miles round.

The great diſparity between the births and burials in London, is owing to this, that the diſſenters of all ſorts, baptize their children without ſending an account of them to the pariſh clerks; ſo that little dependence is to be had on theſe, with regard to calculating annuities for life.

MORTAR, a preparation of lime and ſand, mixed up with water, which ſerves as a cement, and is uſed by maſons and bricklayers, in building of walls of ſtone and brick.

MORTAR-PIECE, a ſhort piece of ordnance, conſiderably thick and wide; ſerving to throw bombs, carcaſſes, fire-pots, &c.

MORTGAGE, in law, a pledge or pawn of lands, tenements, &c. for money borrowed; ſo called, becauſe if the money is not paid at that day, the land dies to the debtor, and is forfeited to the creditor.

The common method of making a mortgage, is by leaſe for a long term of years, wherein a pepper-corn rent has been uſually reſerved: or it may be made by aſſignment for a term, and by leaſe and releaſe. The creditor, who holds the eſtate according to the condition of the deed, is called the mortgagee; but the mortgager, who is the perſon that makes the mortgage, generally keeps poſſeſſion of the land till failure is made in the payment of the mortgage-money; in which caſe, though the mortgagee enters for non-payment, the mortgager has a right to the equity of redemption in the court of chancery, where he may call the mortgagee to an account for the profits of the land mortgaged.

MORTIFICATION, in medicine, the ſame with ſphacelus. See SPHACELUS.

MORTISE, or MORTOISE, in carpentry, &c.

a kind of joint, wherein a hole of a certain depth is made in a piece of timber, which is to receive another piece called a tenon.

MORTMAIN, in law, is the alienation of lands or tenements to any religious houſe, corporation, or fraternity, and their ſucceſſors.

MORTUARY, in the eccleſiaſtical law, is a gift left by a man at his death to his pariſh church, in recompence of perſonal tythes omitted to be paid in his life time: or it is that beaſt, or other cattle, which, after the death of the owner, by the cuſtom of the place, is due to the parſon or vicar, in lieu of tythes or offerings forgot, or not well and truly paid by him that is dead.

MORUS, the mulberry-tree, in botany. See MULBERRY.

MOSAIC, or MOSAIC-WORK, an aſſemblage of little pieces of glaſs, marble, precious ſtones, &c. of various colours, cut ſquare, and cemented on a ground of ſtucco, in ſuch a manner as to imitate the colours and degradations of painting.

MOSCHUS, the muſk-animal, a genus of quadrupeds of the order of the pecora, having no horns; the canine teeth of the upper jaw are exerted.

Of this genus there is only one known ſpecies, which is the animal that produces the perfume, from which it is named. See MUSK.

This creature, when full grown, is three feet in length, from the tip of the noſe to the rump; the head is oblong, and the anterior part much like the greyhound; the ears are large and erect, they reſemble thoſe of the rabbit, and are equal in length to the diameter of the forehead; the tail is not more than two inches in length, and the creature always carries it erect; the body is tolerably fleſhy, and rounded; the legs about a foot in length, and very robuſt; the feet deeply divided, each into two claws in the anterior part, and as many heels behind. The fur on the head and that on the legs is about half an inch long, that on the belly is an inch and a half, and that which grows on the back three inches; theſe hairs are thicker than in any other known animal, and are variegated, from the baſe to the extremity, with diſtinct ſpaces of brown and white: the veſſel or bag in which the perfume (called muſk) is contained, is three inches long and two broad, and hangs under the belly, protuberating near three quarters of an inch beyond the ſurface.

MOSQUE, a temple, or place of religious worſhip, among the mahometans.

All moſques are ſquare buildings, generally built with ſtone; before the chief gate there is a ſquare court, paved with white marble, and low galleries round it, whoſe roof is ſupported by marble pillars. In theſe galleries the Turks waſh themſelves before they go into the moſque. In each moſque there is a great number of lamps; and between theſe, hang many cryſtal rings, oſtriches eggs, and other curioſities, which, when the lamps are lighted, make a fine ſhew.

As it is not lawful to enter the moſques with ſhoes or ſtockings on, the pavements are covered with pieces of ſtuff ſewed together, each being wide enough to hold a row of men kneeling, ſitting, or proſtrate. The women are not allowed to enter the moſque, but ſtay in the porches without. About every moſque there are ſix high towers, called minarets, each of which has three little open galleries, one above another: theſe towers, as well as the moſques, are covered with lead, and adorned with gilding and other ornaments; and from thence, inſtead of a bell, the people are called to prayer by certain officers appointed for that purpoſe.

Moſt of the moſques have a kind of hoſpital belonging to them, in which travellers, of what religion ſoever, are entertained during three days. Each moſque has alſo a place called Tarbé, which is the burying-place of its founders; within which is a tomb, ſix or ſeven feet long, covered with green velvet or ſattin, at the ends of which are two tapers, and round it ſeveral ſeats for thoſe who read the koran, and pray for the ſouls of the deceaſed.

MOSS, *Muſcus*, in botany, a very numerous order of plants, belonging to the cryptogamia claſs, the fructification of which is but little underſtood.

Linnæus, indeed, has attempted to arrange them according to what he takes to be the parts of generation, many of which he acknowledges to be wanting. Hence in the deſcription of ſuch imperfect plants, it becomes neceſſary to diſtinguiſh them according to their general habit and ſtructure.

Moſſes, therefore, may be arranged under the following ſubdiviſions, 1. Such as conſiſt of tender flexible filaments, as byſſus and conferva. 2. Such as conſiſt of a mere foliaceous or gelatinous matter, as phyllona, ulva, &c. 3. Such as conſiſt of firm and ſomewhat rigid ſtalks, as uſnea, platyſma, &c. 4. Such as conſiſt merely of a dry, cruſtaceous, or elſe of a gelatinous matter, as placodium. 5. Such as produce capſules, covered with opercula, as bryum, polytrichum, ſphagnum, mnium, &c. 6. Such as produce capſules without pedicles, and without calyptræ, as lycopodium, triſpermium, ſelago, &c. 7. Such as conſiſt of foliaceous matter, with evident fructifications ariſing from it, as marchantia, jungermannia, anthoceros, &c. See BYSSUS, CONFERVA, &c.

Moſſes are of conſiderable uſe in medicine; uſnea is eſteemed a good deſiccative and aſtringent; the cup moſs is recommended in the chin cough; the grey ground-lichen, or liverwort, againſt the bite of a mad-dog; and other ſpecies, in other diſorders, as mentioned under their reſpective heads.

Moſs is frequently very injurious to fruit-trees, which grow upon cold barren ſoils, or where they are ſo cloſe planted as to exclude the free acceſs of

the air: the only remedy, in ſuch caſes, is to cut down part of the trees, and to plough up the ground between thoſe left remaining; and in the ſpring-ſeaſon, in moiſt weather, you ſhould, with an iron inſtrument made a little hollow, the better to ſurround the branches of the trees, ſcrape off the moſs, carrying it off the place; and by two or three times thus cleanſing them, together with carefully ſtirring the ground, it may be entirely deſtroyed from the trees; but unleſs part of the trees were cut down, and the ground be well ſtirred, the rubbiſh of the moſs will ſignify little.

If the trees are covered with moſs, on account of the dryneſs of the ground, the proper remedy is to lay mud, from the bottom of a river, pretty thick about their roots.

Moss, a name given to boggy grounds in many parts of England.

Theſe conſiſt of a turfy ſurface, below which is a black, moiſt, ſpongy earth, which being dug up with ſpades, ſomewhat in the form of bricks, and dried, is what they call peats, uſed as fuel in ſeveral parts, and the upper ſcurf being cut and dried, makes turfs, another coarſer ſort of fuel.

Wall-Moss, *Bryum*, in botany. See the article Bryum.

MOSTRA, in the Italian muſic, a mark at the end of a line or ſpace, to ſhew that the firſt note of the next line is in that place; and if this note be accompanied with a ſharp or flat, it is proper to place theſe characters along with the moſtra.

MOTAZALITES, the name of a famous ſect among the mahometans, properly ſignifying ſeparatiſts.

The motazalites are not accounted orthodox muſſulmen, as they believe the alkoran to be created and not eternal; and beſides aſſert, that there are no attributes in God diſtinct from his eſſence.

MOTE, in law-books, ſignifies court or convention, as a ward-mote, burgh-mote, ſwain-mote, &c. See the articles Ward-Mote, &c.

MONETTO, in the Italian muſic, a ſort of church-muſic, compoſed with much art and ingenuity, from one to eight parts, with or without inſtruments, and uſually acompanied with a thorough baſs.

MOTH, *Tinea*, or *Phalæna*, in zoology. See Phalæna.

MOTION, is defined to be the continued and ſucceſſive change of place. See Communication *of Motion*.

There are three general laws of motion. 1. That a body always perſeveres in its ſtate of reſt, or of uniform motion in a right line, till by ſome external force it be made to change its ſtate: for as body is paſſive in receiving its motion, and the direction of its motion, ſo it retains them, or perſeveres in them without any change, till it be acted on by ſomething external. From this law it appears, why we inquire not, in philoſophy, concerning the cauſe of the continuation of motion or reſt in bodies, which can be no other than their inertia: but if a motion begin, or if a motion already produced is either accelerated or retarded, or if the direction of the motion is altered, an inquiry into the power or cauſe that produces this change is a proper ſubject of philoſophy. 2. The ſecond general law of motion is, that the change of motion is proportional to the force impreſſed, and is produced in the right line in which that force acts. When a fluid acts upon a body, as water or air upon the vanes of a mill, or wind upon the ſails of a ſhip, the acceleration of the motion is not proportional to the whole force of thoſe fluids, but to that part only which is impreſſed upon the vanes or ſails, which depends upon the exceſs of the velocity of the fluid above the velocity which the vane or ſail has already acquired; for if the velocity of the fluid be only equal to that of the vane or ſail, it juſt keeps up with it, but has no effect either to advance or retard its motion, Regard muſt always be had to the direction in which the force is impreſſed, in order to determine the change of motion produced by it: thus, when the wind acts obliquely with reſpect to the direction of a ſhip, the change of her motion is firſt to be eſtimated in the direction of the force impreſſed; and thence, by a proper application of mechanical and geometrical principles, the change of the motion of the ſhip in her own direction is to be deduced. 3. The third general law of motion is, that action and re-action are equal, with oppoſite directions, and are to be eſtimated always in the ſame right line. Body not only never changes its ſtate of itſelf, but reſiſts by its inertia every action that produces a change in its motion: hence when two bodies meet, each endeavours to perſevere in its ſtate, and reſiſts any change; the one acquires no new motion, but what the other loſes in the ſame direction; nor does this laſt loſe any force, but what the other acquires; and hence, though by their colliſion, motion paſſes from the one to the other, yet the ſum of their motions, eſtimated in a given direction, is preſerved the ſame, and is unalterable by their mutual actions upon each other.

All motion may be conſidered abſolutely or relatively. Abſolute or real motion, ſays Mr. Maclaurin, is when a body changes its place in abſolute ſpace; and relative motion, is when a body changes its place only with relation to other bodies.

From the obſervation of nature, every one knows that there is motion; that a body in motion perſeveres in that ſtate, till by the action of ſome power it is neceſſitated to change it; that it is not in relative or apparent motion in which it perſeveres, in conſequence of its inertia, but in real or abſolute motion. Thus the apparent diurnal motion of the ſun and ſtars would ceaſe, without the leaſt power or force acting upon them, if the motion of the

earth was ſtopped; and if the apparent motion of any ſtar was deſtroyed by a contrary motion impreſſed upon it, the other celeſtial bodies would ſtill appear to perſevere in their courſe. See the article INERTIA.

To make this matter ſtill plainer, Mr. Martin obſerves, that ſpace is nothing but an abſolute and infinite void, and that the place of a body is that part of the immenſe void which it takes up or poſſeſſes: and this place may be conſidered abſolutely, or in itſelf, in which caſe it is called the abſolute place of the body; or elſe with regard to the place of ſome other body, and then it is called the relative or apparent place of the body.

Now as a motion is only the change of place in bodies, it is evident that it will come under the ſame diſtinction of abſolute and relative or apparent. All motion is in itſelf abſolute, or the change of abſolute ſpace; but, when the motions of bodies are conſidered and compared with each other, then are they relative and apparent only: they are relative, as they are compared to each other; and they are apparent only, inſomuch that not their true or abſolute motion, but the ſum or difference of the motions only is perceivable to us.

In comparing the motions of bodies we may conſider them as moving both the ſame way, or towards contrary parts: in the firſt caſe, the difference of motion is only perceived by us; in the latter, the ſum of the motions. Thus, for example, ſuppoſe two ſhips, A and B, ſet ſail from the ſame port upon the ſame rhumb, and that A ſails at the rate of five miles per hour, and B at the rate of three: here the difference of the velocity (viz. two miles per hour) is that by which the ſhip A will appear to go from the ſhip B forwards, or the ſhip B will appear at A to go with the ſame velocity backwards, to a ſpectator in either reſpectively.

If the two ſhips, A and B, move with the ſame degree of velocity, then will the difference be nothing, and ſo neither ſhip will appear to the other to move at all. Hence it is, that though the earth is continually revolving about its axis, yet, as all objects on its ſurface partake of the ſame common motion, they appear not to move at all, but are relatively at reſt.

If two ſhips, A and B, with the degrees of velocity as above, meet each other, the one will appear to the other to move with the ſum of both velocities, viz. at the rate of eight miles per hour; ſo that in this caſe the apparent motion exceeds the true, as in the other it fell ſhort of it. Hence the reaſon why a perſon, riding againſt the wind, finds the force of it much greater than it really is, whereas, if he rides with it, he finds it leſs.

The reaſon of all theſe phænomena of motion will be evident, if we conſider we muſt be abſolutely at reſt, if we would diſcern the true or real motions of bodies about us. Thus a perſon on the ſtrand will obſerve the ſhips ſailing with their real velocity; a perſon ſtanding ſtill will experience the true ſtrength and velocity of the wind; and a perſon, placed in the regions between the planets, will view all their true motions, which he cannot otherwiſe do, becauſe in all other caſes the ſpectator's own motion muſt be added to or ſubtracted from that of the moving body, and the ſum or difference is therefore the apparent or relative motion, and not the true.

Motion is alſo either equable or accelerated.

Equable motion is that by which a body paſſes over equal ſpaces in equal times.

Accelerated motion is that which is continually augmented or increaſed, as retarded motion is that which continually decreaſes; and, if the increaſe or decreaſe of motion be equal in equal times, the motion is then ſaid to be equally accelerated or retarded.

Equable motion is generated by a ſingle impetus or ſtroke; thus the motion of a ball from a cannon is produced by the ſingle action of the powder in the firſt moment, and, therefore, the velocity it firſt ſets out with, would always continue the ſame, were it void of gravity; and to move in an unreſiſting medium; which, therefore, would be always equable, or ſuch as would carry it through the ſame length of ſpace in every equal part of time.

Animal MOTION, is that whereby the ſituation, figure, magnitude, &c. of the parts, &c. of animals are changed: under theſe are compriſed all the animal functions. See the article FUNCTION.

Animal motions are divided into ſpontaneous and natural.

Spontaneous or *muſcular* MOTION, is that performed by the muſcles at the command of the will. See MUSCLE.

Natural or *involuntary* MOTION, that effected, without any ſuch command, by the mere mechaniſm of the parts, ſuch as the motion of the heart, pulſe, &c.

Inteſtine MOTION, the agitation of the particles of which a body conſiſts.

Some philoſophers will have every body, and every particle thereof in continual motion. Hence inteſtine motion is repreſented to be a motion of the internal and ſmaller parts of matter, continually excited by ſome external latent agent, which only diſcovers itſelf by effects, being appointed by nature as the great inſtrument of the changes in bodies.

MOTION, in aſtronomy, peculiarly denotes the orderly courſes of the heavenly bodies.

The motions of the celeſtial luminaries are diurnal or common, and ſecondary or proper.

Diurnal or *primary* MOTION, is that wherein the whole mundane ſphere appears to revolve every day round the earth from eaſt to weſt. See the article DIURNAL.

This

This is called the motion of the primum mobile, and the common motion, to diſtinguiſh it from that peculiar to each planet, &c.

Secondary or *proper* MOTION, is that wherewith a ſtar, planet, &c. advances a certain ſpace every day from weſt towards eaſt. See the article EARTH, &c.

MOTION, in muſic, the manner of beating the meaſure, to haſten or ſlacken the time of the words or notes. See TIME.

MOTIONS, in war, the marches, counter-marches, &c. of an army in changing its poſt.

MOTTO, in armoury, a ſhort ſentence or phraſe carried in a ſcroll, generally under, but ſometimes over the arms; ſometimes alluding to the bearing, ſometimes to the name of the bearer, and ſometimes containing whatever pleaſes the fancy of the diviſer.

MOTU. See the article EX MERO MOTU.

MOVEABLE, in general, denotes any thing capable of being moved.

The moveable feaſts are ſuch as are not regularly held on the ſame day of the year or month, though they are always on the ſame day of the week. Thus Eaſter, which is that moveable feaſt on which all the reſt depend, is held on the Sunday which falls upon, or next after, the firſt full moon following the 21ſt of March; and all the other feaſts keep a regular and certain diſtance from it; ſuch as Septuageſima, Sexageſima, Aſh-wedneſday, Aſcenſion-day, &c. which ſee under their proper articles.

The moveable terms are Eaſter-term and Trinity-term. See TERMS.

MOVEABLE GOODS, in law, ſuch chattels as are capable of being removed from one place to another, as cattle, merchandize, &c. See CHATTELS.

MOVEMENT, in mechanics, a machine that is moved by clockwork; for the theory of which, ſee the articles CLOCK, WATCH, &c.

To make a regular movement, that may ſerve to meaſure time as exactly as poſſible, is one of the moſt valuable problems in mechanics, which has been moſt ſucceſsfully effected, hitherto, by adapting pendulums to clocks: though it muſt be owned, ſays Mr. Maclaurin, that many ingenious contrivances have been invented to correct the irregularities of thoſe movements that go by ſprings.

MOULD, or MOLD, in the mechanic arts, &c. a cavity cut with a deſign to give its form or impreſſion to ſome ſofter matter applied therein, of great uſe in ſculpture, foundery, &c.

MOULDS, in the manufacture of paper, are little frames compoſed of ſeveral braſs or iron-wires, faſtened together by another wire ſtill finer. Each mould is of the bigneſs of the ſheet of paper to be made, and has a rim or ledge of wood to which the wires are faſtened; theſe moulds are more uſually called frames, or forms.

Furnace and Crucible-makers MOULDS, are made of wood, of the ſame form with the crucibles; that is, in form of a truncated cone: they have handles of wood to hold and turn them with, when, being covered with the earth, the workman has a mind to round or flatten his veſſel.

MOULDS *for Leaden Bullets*, are little iron pincers, each of whoſe branches terminates in an hemiſpherical concavity, which when ſhut, form an intire ſphere: in the lips or ſides where the branches meet, is a little jet or hole, through which the melted led is conveyed.

Glaziers-MOULDS. The glaziers have two kinds of moulds, both ſerving to caſt their lead. In the one they caſt the lead into long rods or canes, fit to be drawn through the vice, and the grooves formed therein: this they ſometimes call ingot-mould. In the other they mould thoſe little pieces of lead a line thick, and two lines broad, faſtened to the iron-bars: theſe may be alſo caſt in the vice.

Goldſmiths-MOULD. The goldſmiths uſe the bones of the cuttle-fiſh to make moulds for their ſmall works, which they do by preſſing the pattern between two bones, and leaving a jet or hole to convey the ſilver through, after the pattern has been taken out.

MOULD, among maſons, a piece of hard wood or iron hollowed withinſide, anſwering to the contours of the mouldings or corniches, &c. to be framed; this is otherwiſe called caliber.

MOULDS, among plumbers, are the tables whereon they caſt the ſheets of lead. Theſe they ſometimes call ſimple tables: beſides which they have other real moulds wherewith they caſt pipes without ſoldering. See PLUMBERY.

MOULDS, among tallow-chandlers, are of two kinds: the firſt for the common dipped candles, being the veſſel wherein the melted tallow is diſpoſed, and the wick dipped: this is of wood, of a triangular form, and ſupported on one of its angles, ſo that it has an opening of near a foot at top: the other, uſed in the fabric of mould candles, is of braſs, pewter, or tin; here each candle has its ſeveral moulds. Ses CANDLE.

MOULD, among gold-beaters, a certain number of leaves of vellom, or pieces of guts, cut ſquare, of a certain ſize, and laid over one another, between which they put the leaves of gold and ſilver, which they beat on the marble with the hammer. They have four kinds of moulds, two whereof are of vellom, and two of gut; the ſmalleſt of thoſe of vellom conſiſts of forty or fifty leaves, the largeſt contains an hundred; for the others, each contains five hundred leaves. The moulds have all their ſeveral caſes, conſiſting of two pieces of parchment, ſerving to keep the leaves of the mould in their place, and prevent their being diſordered in beating.

MOULD,

MOULD, in agriculture, a looſe kind of earth, every where obvious on the ſurface of the ground, called alſo natural or mother-earth; by ſome alſo loam. See EARTH.

MOULDINESS, a term applied to bodies which corrupt in the air, from ſome hidden principle of humidity therein; and whoſe corruption ſhews itſelf by a certain white down, or lanugo, on their ſurface, which, viewed through a microſcope, appears like a kind of meadow, out of which ariſe herbs and flowers, ſome only in the bud, others full blown, and others decayed, each having its root, ſtalk, and other parts.

MOULDING, any thing caſt in a mould, or that ſeems to have been ſo, though in reality, it were cut with a chiſſel, or the ax.

MOULDING, in architecture, projectures beyond the naked wall, column, wainſcot, &c. the aſſemblage of which forms corniches, door-caſes, and other decorations of architecture.

MOULDING, in ſhip-building, the juttings or projectures beyond the level of the ſide; they are placed above one another; the intervals of which are generally ornamented with martial inſtruments, trophies of war, marine and other emblematical figures, &c.

MOULINET, in mechanics, is uſed to ſignify a roller, which, being croſſed with two levers, is uſually applied to cranes, capſtans, and other ſorts of engines of the like nature, to draw ropes, and heave up ſtones, &c.

MOULINET is alſo a kind of turnſtile, or wooden croſs, which turns horizontally upon a ſtake fixed in the ground; uſually placed in paſſages to keep out horſes, and to oblige paſſengers to go and come one by one. Theſe moulinets are often ſet near the outworks of fortified places, at the ſides of the barriers, through which people paſs on foot.

MOULTING, or MEWING. See the article MEWING.

MOUND, a term uſed for a bank or rampart, or other fence, particularly that of earth.

MOUND, in heraldry, a ball or globe with a croſs upon it, ſuch as our kings are uſually drawn with, holding it in their left hands, as they do the ſceptre in the right.

MOUNT-EGG. In the tin-works, after the tin from the burnt ore is melted down and remelted, there will ſometimes remain a different ſlug in the bottom of the float; this they call mount-egg: and though of a tin colour, yet is of an iron nature, as has been found by applying a magnet to it.

MOUNTAIN, *Mons*, a part of the earth, riſing to a conſiderable height above the level of the ſurface thereof.

Burning-MOUNTAIN. See VULCANO.

MOUNTING, in the mechanic arts, ſomething that ſerves to raiſe or ſet off a work: thus, the frame and its dependences make the mounting of a looking-glaſs; the hilt, the mounting of a ſword; the fuſt, or but, the mounting of a carabine, muſquet, &c. and the mounting of a fan, is the ſticks which ſerve to open and ſhut it.

MOUNTING, in military affairs, ſignifies going upon duty: thus, mounting a breach, is running up to it; mounting the guard, is going upon guard; and mounting the trenches, is going upon duty in the tranches: but mounting a cannon, mortar, &c. is the ſetting it on its carriage, or the raiſing its mouth.

MOUSE, among ſailors, a ſort of riſing made on the ſtays, and ſome other ropes, in a ſhip, to prevent the eye, in one end of the rope, from ſlipping up above its proper place, or the body of it.

The mouſe, which ſomewhat reſembles a pear, is raiſed by winding tarred canvas, called parſling, about the ſtay in one place, and afterwards a great many turns of ſpun-yarn: the whole is completed by weaving a coat or cover round the mouſe very curiouſly, which is called pointing. See the article POINTING.

MOUSE-EAR, *Myoſotis*, in botany. See the article MYOSOTIS.

MOUTH, in anatomy, a part of the face, conſiſting of the lips, the gums, the inſides of the cheeks, the palate, the ſalival glands, the os hyoides, the uvula, and the tonſils; which ſee under their proper articles.

MOXA, a ſort of cotton or downy ſubſtance, ſeparated from the leaves of a ſort of Indian mugwort; uſed by the eaſtern nations for cauterizing in certain parts of the body.

MUCILAGE, in pharmacy, is in general any viſcid and glutinous liquor.

MUCILAGE alſo denotes a thick pituitous matter, evacuated with the urine, in the gravel and dyſuria.

MUCILAGE likewiſe imports the liquor which principally ſerves to moiſten the ligaments and cartilages of the articulations; and is ſupplied by the

MUCILAGINOUS GLANDS, in anatomy, a very numerous ſet of glands, ſerving to ſecrete the mucilage of the joints. See GLAND.

MUCOR, in botany, a genus of muſhrooms, being funguſes conſiſting of little roundiſh bladders, in which are found numerous ſeeds, affixed to hair-like receptacles, placed all over the inſide of the bladders.

MUCOUS GLANDS, in anatomy three glands which empty themſelves into the urethra; ſo called by their firſt diſcoverer, Mr. Cowper, from the tenacity of the liquor which they ſeparate.

MUCRO CORDIS, in anatomy, the lower or pointed end of the heart.

MUCUS, a mucilaginous liquor, ſeparated by the mucous glands and the noſtrils.

MUFFLE, in metallurgy, an arched cover, reſiſting the ſtrongeſt fire, and made to be placed over cop-

coppels and teſts, in the operations of aſſaying, to preſerve them from the falling of coals and aſhes into them; though, at the ſame time, of ſuch a form, as is no hindrance to the action of the air and fire on the metal, nor to the inſpection of the aſſayer.

The muffles may be made of any form, providing they have theſe conditions: but thoſe uſed with coppels are commonly made ſemi-cylindrical; or when greater veſſels are employed, in form of a hollow hemiſphere. The muffle muſt have holes, that the aſſayer may look in; and the fore-part of it muſt be always quite open, that the air may act better in conjunction with the fire, and be inceſſantly renewed: the apertures in the muffle ſerve alſo for the regimen of the fire, for the cold air ruſhing into the large opening before, cools the bodies in the veſſel; but if ſome coals are put in it, and its aperture before be then ſhut, with a door fitted to it, the fire will be increaſed to the higheſt degree, much more quickly than it can be by the breathing holes of the furnace.

MUFTI, or MUPHTI, the chief of the eccleſiaſtical order, or primate, of the muſſulman religion.

MUGGLETONIANS, a religious ſect, which aroſe in England about the year 1657; ſo denominated from their leader, Lodowick Muggleton, a journeyman taylor, who, with his aſſociate Reeves, ſet up for great prophets; pretending, as it is ſaid, to have an abſolute power of ſaving and damning whom they pleaſed; and giving out, that they were the two laſt witneſſes of God, that ſhould appear before the end of the world.

MUGWORT, *Artemiſia*, in botany. See ARTEMISIA.

MULBERRY-TREE, *Morus*, in botany, a genus of plants of the monoecia-triandria claſs; the male flowers are collected in a long amentum, having no corolla: the ſtamina are four erect ſubulated filaments, longer than the cup, and terminated with ſimple antheræ: the female flowers have no petals; they are collected in round heads, and are ſucceeded by a well-known, large, fleſhy, ſucculent berry, compoſed of ſeveral protuberances, in each of which is placed an oval pointed ſeed.

Of mulberries, there are two kinds, the black and the white; but the black is moſt common with us. They are propagated by ſowing the ſeeds, or by laying down the fruit-bearing branches; but thoſe propagated by ſeeds are commonly moſt vigorous, though they ſeldom prove ſo fruitful as the others. They may alſo be increaſed from cuttings, planted in March.

The ſoil mulberry-trees delight in, is a rich light earth, of a good depth; they ſhould never be planted near other trees or buildings, for then the fruit will not ripen ſo well.

Mulberries have the qualities common to other ſweet fruits, in abating heat and quenching thirſt; they are chiefly eaten for pleaſure, but they yield little nouriſhment.

The leaves of this plant are uſed in France, Italy, Perſia, &c. for feeding ſilk-worms; for which purpoſe, they ſhould never be allowed to grow tall, but kept in a ſort of hedge; and inſtead of pulling off the leaves ſingly, they ſhould be cut off with ſheers, together with the young branches.

MULCT, a fine of money laid upon a man, who has committed ſome fault or miſdemeanor.

MULCH, a term uſed by gardeners for rotten dung, or the like, thrown upon beds of young plants, to preſerve them from the bad effects of cold or drought.

MULE, in zoology, a mongrel kind of quadruped, uſually generated between an aſs and a mare, and ſometimes between a horſe and a ſhe-aſs.

The mule is a ſort of a monſter, of a middle nature between its parents, and therefore incapable of propagating its ſpecies; ſo careful is nature to avoid filling the world with monſters.

Mules are chiefly uſed in countries where there are rocky and ſtony roads, as about the Alps, Pyrenees, &c.

MULLEIN, *Verbaſcum*, in botany. See VERBASCUM.

MULLER, or MULLAR, denotes a ſtone flat and even at the bottom, but round at top, uſed for grinding matters on a marble.

The apothecaries uſe mullers to prepare ſome of their teſtaceous powders, and painters for their colours, either dry or in oil.

MULLER is alſo an inſtrument uſed by the glaſs-grinders; being a piece of wood, to one end whereof is cemented the glaſs to be ground: it is ordinarily about ſix inches long, turned round.

MULLET, *Mugil*, in ichthyology, a genus of the acanthopterygeous fiſhes, the head of which is of a depreſſed form in the anterior part, and the body oblong and compreſſed. On each ſide of the head, below the noſtrils, there ſtands a little bone, which is ſerrated on its lower part: the eyes are not covered with a ſkin: and there are teeth on the tongue and palate, but none in the jaws or fauces: the branchioſtege membrane on each ſide contains ſix officles; theſe are of a crooked figure, and the upper one, which is the broadeſt, is covered by the coverings of the gills in ſuch a manner, that only five appear.

MULLET, or MOLLET, in heraldry, a bearing in form of a flat, or rather of the rowel of a ſpur, which it originally repreſented.

The mullet has but five points; when there are ſix, it is called a ſtar; though others make this difference, that the mullet is, or ought to be, always pierced, which a ſtar is not.

The mullet is uſually the difference or diſtinguiſh-

ing mark for the fourth ſon, or third brother, or houſe; though it is often borne alone, as coat-armour.

MULTANGULAR, a figure, or body, which has many angles.

MULTILATERAL, in geometry, is applied to thoſe figures which have more than four ſides or angles, more uſually called polygons. See the article POLYGON.

MULTINOMIAL, or MULTINOMIAL ROOTS, in mathematics, ſuch roots as are compoſed of many names, parts, or members; as $a+b+d+c$, &c. See the article ROOT.

MULTIPLE, *Multiplex*, in arithmetic, a number which comprehends ſome other ſeveral times; thus 6 is a multiple of 2, and 12 is a multiple of 6, 4, and 3, comprehending the firſt twice, the ſecond thrice, &c.

MULTIPLE RATIO, or PROPORTION, is that which is between multiples. If the leſſer term of the ratio be an aliquot part of the greater, the ratio of the greater to the leſs is called multiple; and that of the leſs to the greater ſubmultiple. A ſubmultiple number is that contained in the multiple; thus the numbers 1, 2, and 3, are ſubmultiples of 9. Duple, triple, &c. ratios, as alſo ſubduples, ſubtriples, &c. are ſo many ſpecies of multiple and ſubmultiple ratios. See RATIO.

MULTIPLICAND, in arithmetic, one of the factors in the rule of multiplication; being that number which is given to be multiplied by another, which is called the multiplicator, or multiplier.

MULTIPLICATION, in general, the act of increaſing the number of any thing.

MULTIPLICATION, in arithmetic, is a rule, by which any given number may be ſpeedily increaſed, according to any propoſed number of times.

Multiplication, which is the fourth rule in arithmetic, ſerves inſtead of many additions; the product of a multiplication being only the repetition of the multiplicand, ſo many times as there are units in the multiplier.

Caſe I. To multiply ſingle numbers by one another.

All the variety that can happen in this caſe, is expreſſed in the following table of multiplication, which muſt be perfectly got by heart, for the ready performance of any operation in multiplication: thus we learn, by the table, that 3 times 3 is 9; that 3 times 6 is 18, &c. We have in this table, omitted multiplying with 2, it being ſo very eaſy that any one may do it.

MULTIPLICATION TABLE.

3×3=9	4×4=16	5×5=25	6×6=36	7×7=49	8×8=64
3×4=12	4×5=20	5×6=30	6×7=42	7×8=56	8×9=72
3×5=15	4×6=24	5×7=35	6×8=48	7×9=63	9×9=81
3×6=18	4×7=28	5×8=40	6×9=54		
3×7=21	4×8=32	5×9=45			
3×8=24	4×9=36				
3×9=27					

Caſe II. To multiply a compound number by a ſingle one.

Rule. Having placed the multiplier under the unit's place of the multiplicand; firſt, multiply the unit of the multiplicand by the multiplier; if their product be leſs than ten, ſet it down underneath its own place of units, and proceed to the next figure of the multiplicand: but if their product be above ten, or tens, then ſet down the overplus only, or odd figure, as in addition, and carry the ſaid ten or tens in mind, till you have multiplied the next figure of the multiplicand with the multiplier: then, to their product add the ten or tens beared in mind, ſetting down the overplus of their ſum above the tens, as before; and ſo proceed in that manner till all the figures of the multiplicand are multiplied with the multiplier.

Example. Suppoſe it were required to multiply 3213 by 3.

3213 Multiplicand.
3 Multiplier.
9639

For, beginning at the unit's place 3, ſay, 3 times 3 is 9, which, becauſe it is leſs than ten, ſet down underneath its own place, and proceed to the next place of tens, ſaying 3 times 1 is 3, which ſet down underneath its own place; then at the next place, viz. of hundreds, ſay, 3 times 2 is 6, which ſet down as before; laſtly, at the place of thouſands, ſay, 3 times 3 is 9, which being ſet down underneath its own place, the operation is finiſhed, and the true product is 9639.

Caſe III. To multiply one compound number by another.

Rule. Place every number reſpectively under its own kind; multiply each figure of the multiplicand by each figure of the multiplier as before; and obſerve to ſet the firſt figure of each reſpective product under that figure of the multiplier, by which it was made; laſtly, add the ſeveral products together for the whole product.

Example

Example 1. Let it be required to multiply 78094 by 7563.

78094	Multiplicand.
7563	Multiplier.
234282	The firſt particular product with 3.
468564	The ſecond particular product with 60.
390470	The third particular product with 500.
546658	The 4th particular product with 7000.
590624922	The total, or true product required.

When there is a cypher or cyphers to the right hand, either of the multiplicand or multiplier, or to both, in that caſe, multiply the figures as before, neglecting the cyphers until the particular products are added together; then to their ſum annex ſo many cyphers as there are in either or both the factors, as in the following examples:

Example 2.	Example 3.	Example 4.
9538	87600	785000
4600	79	56900
57228	7884	7065
38152	6132	4710
43874800	6920400	3925
		44666500000

If it be required to multiply any number by 10, 100, 1000, 10000, &c. it is only annexing the cyphers of the multiplier to the figures of the multiplicand, and the work is done: thus $578 \times 10 = 5780$, $578 \times 100 = 57800$, $578 \times 1000 = 578000$, $578 \times 10000 = 5780000$, &c. If a quantity be multiplied by the component part of the multiplier, the product will be the ſame as if it had been multiplied by the multiplier itſelf: thus, 245 by 7, and the product by 6 is the ſame as if 245 was multiplied by 7×6, that is, by 42.

For the proof of multiplication, it is to be obſerved, that the product is then right when being divided by the multiplier it quotes the multiplicand; or divided by the multiplicand it quotes the multiplier. See DIVISION.

Croſs MULTIPLICATION, otherwiſe called duodecimal arithmetic, is an expeditious method of multiplying things of ſeveral ſpecies or denominations, by others likewiſe of different ſpecies, &c. viz. ſhillings and pence, by ſhillings and pence; feet and inches, by feet and inches.

This is much uſed in meaſuring, &c. and the method is thus:

Suppoſe 5 feet 3 inches to be multiplied by 2 feet 4 inches; ſay, 2 times 5 feet is 10 feet, and 2 times 3 is 6 inches; again, ſay, 4 times 5 is 20 inches, or 1 foot 8 inches; and 4 times 3 is 12 parts, or 1 inch: the whole ſum makes 12 feet 3 inches. In the ſame manner you may manage ſhillings and pence, &c.

F.	I.
5	3
2	4
10	6
1	8
	1
12	3

For the multiplication of vulgar and decimal fractions, ſee FRACTION and DECIMAL.

MULTIPLICATION, in algebra. The general rule for the ſigns is, that when the ſigns of the factors are alike (*i. e* both + or both −) the ſign of the product is +; but when the ſigns of the factors are unlike, the ſign of the product is −.

Caſe 1. When any poſitive quantity, $+a$, is multiplied by any poſitive number, $+n$, the meaning is, that $+a$ is to be taken as many times as there are units in n; and the product is evidently na.

Caſe 2. When $-a$ is multiplied by n, then $-a$ is to be taken as often as there are units in n; and the product muſt be $-na$.

Caſe 3. Multiplication by a poſitive number implies a repeated addition: but multiplication by a negative implies a repeated ſubtraction. And, when $+a$ is to be multiplied by $-n$, the meaning is that $+a$ is to be ſubtracted as often as there are units in n: therefore the product is negative, being $-na$.

Caſe 4. When $-a$ is to be multiplied by $-n$, then $-a$ is to be ſubtracted as often as there are units in n; but to ſubtract $-a$ is equivalent to adding $+a$, conſequently the product is $+na$. The ſecond and fourth caſes may be illuſtrated in the following manner:

It is evident that $+a-a=0$; therefore if we multiply $+a-a$ by n, the product muſt vaniſh or be 0, becauſe the factor $a-a$ is 0. The firſt term of the product is $+na$ (by caſe 1.) Therefore, the ſecond term of the product muſt be $-na$, which deſtroys $+na$; ſo that the whole product muſt be $+na-na=0$. Therefore, $-a$ multiplied by $+n$ gives $-na$.

In the like manner, if we multiply $+a-a$ by $-n$, the firſt term of the product being $-na$, the latter term of the product muſt be $+na$, becauſe the two together muſt deſtroy each other, or their amount 0, ſince one of the factors (viz. $a-a$) is 0. Therefore, $-a$ multiplied by $-n$ muſt give $+na$.

If the quantities to be multiplied are ſimple, find the ſign of the product by the laſt rule; after it place the product of the co-efficients, and ſet down all the letters after one another as before.

EXAMPLES.

Mult.	$+a$	$-2a$	$+6x$
By	$+b$	$+4b$	$-5a$
Product	$+ab$	$-8ab$	$-30ax$

Mult.	$-8x$	$+3ab$
By	$-4a$	$-5ac$
Product	$+32ax$	$-15aabc$.

To multiply compound quantities, you muſt multiply every part of the multiplicand by all the parts of the multiplier taken one after another, and then collect

collect all the products into one sum: the sum shall be the product required.

Mult.	$a + b$	$2a - 3b$
By	$a + b$	$4a + 5b$
Prod.	$aa + ab$	$8aa - 12ab$
	$+ ab + bb$	$+ 10ab - 15bb$
Sum	$aa + 2ab + bb$	$8aa - 2ab - 15bb$

Mult.	$2a - 4b$	$xx - ax$
By	$2a + 4b$	$x + a$
Prod.	$4aa - 8ab$	$xxx - axx$
	$+ 8ab - 16bb$	$+ axx - aax$
Sum	$4aa \ldots 0 \ldots - 16bb$	$xxx \ldots 0 \ldots - aax$

Mult. $aa + ab + bb$
By $a - b$
Prod. $aaa + aab + abb$
$- abb - abb - bbb$
Sum $aaa \ldots 0 \ldots 0 \ldots - bbb$

Products that arise from the multiplication of 2, 3, or more quantities, as abc, are said to be of 2, 3, or more dimensions; and those quantities are called factors or roots.

If all the factors are equal, then these products are called powers; as aa or aaa are powers of a. Powers are expressed sometimes by placing, above the root to the right hand, a figure expressing the number of factors that produce them. thus:

a	1st	power of the root a, and is generally expressed thus:	a
aa	2d		a^2
aaa	3d		a^3
$aaaa$	4th		a^4
$aaaaa$	5th		a^5

These figures which express the number of factors that produce powers are called their indices or exponents; thus 2 is the index of a^2. And powers of the same root are multiplied by adding their exponents thus: $a^2 \times a^3 = a^5$. $a^4 \times a^3 = a^7$. $a^3 \times a = a^4$.

Sometimes it is useful not actually to multiply compound quantities, but to set them down upon the sign of multiplication ($\times$) between them, drawing a line over each of the compound factors. Thus $\overline{a+b} \times \overline{a-b}$ expresses the product of $a + b$ multiplied by $a - b$.

MULTIPLICATION of surds. See SURDS.

MULTIPLICATOR, or MULTIPLIER, in arithmetic, a number multiplying another called the multiplicand.

The larger number is generally made the multiplicand, and is placed above the smaller, or multiplicator: but the result is the same, which soever of the numbers be made multiplicand, or multiplier.

MULTIPLYING-GLASS, in optics, one wherein objects appear increased in number.

It is otherwise called a polyhedron, being ground into several planes, that make angles with each other; through which the rays of light issuing from the same point undergo different refractions, so as to enter the eye from every surface in a different direction.

MULTISILIQUOUS PLANTS, those which have after each flower many distinct, long, slender, siliquæ, or pods, in which their seed is contained: such are bear's-foot, columbine, house-leek, navel-wort, orpine, &c.

MULTITUDE, an assemblage, or collection of a great number of distinct persons or things.

MULTIVALVES, in natural history, the name of a general class of shell-fish; distinguished from the univalves, which consist of only one shell, and the bivalves, which consist of two; by their consisting of three or more shells.

MUM, a kind of malt-liquor, much drank in Germany; and chiefly brought from Brunswick, which is the place of most note for making it. The process of brewing mum, as recorded in the town-house of that city, is as follows: Take sixty-three gallons of water that has been boiled till one-third part is consumed, and brew it with seven bushels of wheaten-malt, one bushel of oat-meal, and one bushel of ground beans; when it is tunned, the hogshead must not be filled too full at first; as soon as it begins to work, put into it three pounds of the inner rind of fir; one pound of the tops of fir and beach; three handfuls of carduus benedictus; a handful or two of the flowers of rosa solis; add burnet, betony, marjoram, avens, penny-royal, and wild thyme, of each a handful and a half; of elder-flowers, two handfuls or more; seeds of cardamum bruised, thirty ounces; barberries bruised, one ounce: when the liquor has worked a while, put the herbs and seeds into the vessel; and, after they are added, let it work over as little as possible; then fill it up: lastly, when it is stopped, put into the hogshead ten new-laid eggs unbroked: stop it close, and drink it at two years end. Our English brewers, instead of the inner rind of fir, use cardamum, ginger, and sassafras; and also add elecampane, madder, and red-sanders. Mum, on being imported, pays for every barrel 1 l. 5 s.

MUMMY, a body embalmed or dried, in the manner used by the ancient Egyptians: or the composition with which it is embalmed.

MUMMY, among gardeners, a kind of wax used in grafting and planting the roots of trees, made in the following manner: Take one pound of black pitch, and a quarter of a pound of turpentine; put them together into an earthen pot, and set them on fire in the open air, holding something in your hand to cover and quench the mixture in time, which is to be alternately lighted and quenched till all the nitrous and volatile parts be evaporated. To this a little common wax is to be added; and the composition is then to be set by for use.

MUNDIC, in natural hiſtory, a metallic mineral, more commonly called marcaſite.

MUNICIPAL, in the Roman cival law, an epithet which ſignifies inveſted with the rights and privileges of Roman citizens.

MUNIMENTS, or MINIMENTS, the writings relating to a perſon's inheritance, by which he is enabled to defend his title to his eſtate: or, in a more general ſenſe, all manner of evidences, ſuch as charters, feofments, releaſes, &c.

MUNIMENT-HOUSE, a little ſtrong room in a cathedral, college, or univerſity, deſtined for keeping the ſeal, charters, &c. of ſuch cathedral, college, &c.

MUNIONS, in architecture, are the ſhort, upright poſts or bars which divide the ſeveral lights in a window-frame.

MUNITION, the proviſions with which a place is furniſhed in order for defence; or that which follows a camp for its ſubſiſtence.

MUNITION-SHIPS, are thoſe that have ſtores on board in order to ſupply a fleet of men of war at ſea. In an engagement, all the munition ſhips, and victuallers attending the fleet, take their ſtations in the rear of all the reſt; they are not to engage in the fight, but to attend ſuch directions as are ſent them by the admiral.

MUNTINGIA, in botany, a genus of plants whoſe flower conſiſts of five roundiſh patent petals inſerted in the cup; the ſtamina are a great number of very ſhort capillary filaments, topped with roundiſh antheræ. The fruit is a globoſe, umbilicated berry, containing a great many very ſmall roundiſh ſeeds.

MURAGE, a toll taken of every cart or horſe coming laden into a city, for repairing the walls.

MURAL, in general, any thing belonging to a wall, which the Latins call murus.

MURAL ARCH, is a wall, or walled arch, placed exactly in the plane of the meridian, for fixing a large quadrant, ſextant, or other inſtrument, in order to obſerve the meridian altitudes of the heavenly bodies.

MURDER, or MURTHER, in law, is the wilful and felonious killing a perſon from premeditated malice; provided the party wounded or otherwiſe hurt, die within a year and a day after the fact was committed.

MURDERERS, or MURDERING PIECES, in a ſhip, are ſmall pieces of ordnance, either of braſs or iron, which have chambers put in at their breeches. They are uſed at the bulk-heads of the forecaſtle, half-deck, or ſteerage, in order to clear the deck, on the ſhip's being boarded by an enemy.

MUREX, in natural hiſtory, a genus of univalve or ſimple ſhells, without any hinge, formed of a ſingle piece, and beſet with tubercles or ſpines: the mouth is large and oblong, and has an expanded lip, and the clavicle is rough.

MURRAIN, or GARGLE, a contagious diſeaſe among cattle, principally cauſed by a hot dry ſeaſon, or rather by a general putrifaction of the air, which begets an inflammation of the blood, and a ſwelling in the throat, that ſoon prove mortal, and is communicated from one to another, though it generally goes no farther than to thoſe of the ſame kind.

The ſymptoms of this diſeaſe are a hanging down and ſwelling of the head, abundance of gum in the eyes, rattling in the throat, a ſhort breath, palpitation at the heart, ſtaggering, a hot breath, and a ſhining tongue.

In order to prevent this diſeaſe, the cattle ſhould ſtand cool in ſummer, have plenty of good water; all carrion ſhould be ſpeedily buried; and as the feeding of cattle in wet places, on rotten graſs and hay, often occaſions this diſeaſe, dry and ſweet fodder ſhould be given them. The following receipt is much recommended for the cure of this diſeaſe in black cattle: Take diapente, a quarter of an ounce; dialthæa or marſhmallows, London treacle, mithridate and rhubarb, of each the quantity of a nut; of ſaffron a ſmall quantity; wormwood, and red ſage, of each an handful; and two cloves of garlic: boil all together in two pints of beer, till it be reduced to a pint and a half, and give it the beaſt luke warm, while faſting: half the proportion will ſerve for a cow. They muſt be kept warm, and take a maſh of ground malt, drinking warm water for a week, and ſometimes have boiled oats. If ſheep are troubled with this diſtemper, give them a few ſpoonfuls of brine, and then a little tar.

MURREY, in heraldry, a kind of purple colour.

MUSA, the plantain tree, in botany. See the article PLANTAIN.

MUSCADINE, a rich kind of wine, of the growth of Provence and Languedoc, in France.

MUSCARI, muſk hyacinth, in botany, a genus of plants, whoſe flower conſiſts of an oval pitcher-ſhaped petal, reflexed at the brim with three nectariums and ſix ſubulated filaments, topped with antheræ coaleſcing together. The fruit is a roundiſh, trigonal capſule, having three cells, which contain ſeveral roundiſh ſeeds.

MUSCLE, *Muſculus*, in anatomy, a part of the human body, deſtined to move ſome other part, and that in general by a voluntary motion, or ſuch as is dictated by the will; being compoſed principally of fleſh and tendinous fibres, which have alſo veſſels of all kinds, as arteries, veins, nerves, and lymphatics; all which are ſurrounded by, or encloſed in, one common membrane.

The muſcular fibres are, according to the action they are intended for, of various directions; ſome ſtreight, others oblique, tranſverſe, annular, and ſpiral. Some conſiſt of one uniform ſeries of fibres, and on that account are called ſimple; others are compoſed of various, and often contrary courſes of

 fibres,

fibres, and these being closely arranged together, the large one seems to be made up of a number of lesser muscles, and is therefore called compound; and the more of these clusters of fibres, or smaller vessels, enter into the composition of a larger one, the thicker and stronger it is.

A muscle is divided, by anatomists, into the body, and the two extremities: the body is also called the venter or belly of the muscle; and the two extremities, if white, are called tendons.

That extremity where the muscle arises, is called its head, caput; or its beginning, origin, or fixed point: and its other extremity, or end, is called its tail, moveable point, and often its tendon; and, finally, if this be broad and membranous, it is called an aponeurosis.

In many of the muscles, both the extremities are moveable: in these, that part which of the two is least moveable, is always called the head, and the more moveable part the tail. This, however, cannot be done universally; since there are cases in which that extremity of a muscle, which was before the moveable point, becomes the fixed point; and *vice versa*, as in the serrati antici, and some of the muscles of the abdomen, not to mention any others.

Action of the MUSCLES. This consists in the contraction of its belly, after whatever manner that is done: by this means its extremities approach towards each other; and, by this means also, the part in which the end of the muscle is inserted, moves as if it were drawn by a cord. Schelhammer is of opinion, that this contraction of the belly of the muscle is effected by a corrugation of the fibres, in the same manner as we see an earth-worm shorten and contract itself by corrugating its skin, &c. Morgagni, on the other hand, alledges, that in order to understand the power of motion in a muscle, we ought to attend to Wallis's experiment; by which it is evidently proved, that the smallest force imaginable of the air, driven through a cylindric tube into a bladder, will, by distending its width, and shortening its length, cause it to rise up, and sustain a weight of sixty or seventy pounds.

Others have demonstrated, from hydrostatical principles, that a very small quantity of a fluid, directed through a small cylindric tube, placed in a vessel of a larger base, and already filled, will be able, in the same manner, to move and raise up a large weight; from whence they conclude, that the belly of a muscle swells in the time of its contraction or action; and that this intumescence may, nay and must, have very great effects.

Among the muscles, there are different ones that conspire in the same action, and so perform the same motion as associates: such are the flexors or extensors of the arm, and the like: hence these, and such others as conspire in the same manner to the same action, are called by authors socii and congeneres.

When, on the other hand, we regard the contrary actions of certain muscles, as the extensors of any part which act quite contrary to the flexors, these are called antagonist muscles; in this case both the kinds acting together, render the limbs rigid or immoveable: this action of the muscles is called motus tonicus.

MUSCLE, *Mytulus*, in natural history, a shell composed of two valves, of an oblong figure, and shutting close all the way; the valves are both convex, and of a similar shape: and the animal inhabiting it is called a tethys.

MUSCOVY-GLASS, in natural history, the white shining specularis with large and broad leaves, otherwise called isinglass. See the article SPECULARIS.

MUSCULAR, or MUSCULOUS, in anatomy, something relating to, or partaking of the nature of a muscle. See the article MUSCLE.

MUSEUM, a name which originally signified a part of the palace of Alexandria, which took up at least one fourth of that city. This quarter was called the museum, from its being set apart for the muses and the study of the sciences. Here were lodged and entertained the men of learning, who were divided into many companies or colleges, according to the sciences of which they were the professors; and to each of these houses or colleges was allotted a handsome revenue. The foundation of this establishment is attributed to Ptolemy Philadelphus, who here placed his library. Hence the word museum is now applied to any place set apart as a repository for things that have an immediate relation to the arts.

MUSES, certain fabulous divinities amongst the pagans, supposed to preside over the arts and sciences: for this reason it is usual for the poets, at the beginning of a poem, to invoke these goddesses to their aid.

MUSHROOM, *Fungus*, in botany, a genus of imperfect plants, composed of a pedicle, crowned with a broad head, convex and smooth at the top; and hollow, foliated, lamellated, or fistulous on the under side.

Mushrooms are by many supposed to be produced from the putrefaction of the dung in which they are found; but notwithstanding this notion is pretty generally received among the unthinking part of mankind, yet, by the curious naturalists, they are esteemed real plants; for they have a regular root, a stalk consisting of several arrangements of fibres, the interstices of which are filled up with a parenchymatous substance, leading from the root to the head or umbel, the under-side of which is full of lamellæ or chives, every one of which is a regular pod or seed-vessel. If these lamellæ are examined in their several states, the seeds in them may be easily discovered, and are always found to be of a size and degree of maturity proportioned to the state

of the plant: they have each of them alſo a ſiliquaceous aperture lengthwiſe, the ſeeds lying in rows ready to fall through it. The plant is eaſily and regularly propagated through theſe, and may not only be raiſed from ſeed, but, like many other plants, may be propagated by roots; the ſeveral filaments at the root producing tubercles, in the manner of the potatoe; from each of which there will ariſe new roots, and a new plant. Hence, like other vegetables, they are annually propagated by the gardeners near London for ſale. We ſhall therefore deſcribe the method of cultivating them; but as there are ſeveral unwholeſome ſorts, we ſhall firſt give a ſhort deſcription of the true eatable kinds. Theſe at firſt appear of a roundiſh form, like a button, the upper part of which, as alſo the ſtalk, is very white: but being opened, the under part is of a livid fleſh-colour, but the fleſhy part, when broken, is very white: when theſe are ſuffered to remain undiſturbed, they will grow to a large ſize, and explicate themſeves almoſt to a flatneſs, and the red part underneath will change to a dark colour.

Mr. Miller directs the following method of cultivating them. If you have no beds of your own that produce them, you ſhould look abroad in rich paſtures, during the months of Auguſt and September, till you find them; and then opening the ground about their roots, you will often find the earth full of ſmall white knobs, which are off-ſets from the muſhrooms: theſe ſhould be carefully gathered, and preſerved dry with the earth about them. The muſhroom-beds ſhould be made of dung in which there is good ſtore of litter. Theſe beds ſhould be made on dry ground, and the dung being laid upon the ſurface about a foot thick, two feet and a half broad, and of a length in proportion to the quantity of muſhrooms deſired, it ſhould be covered about four inches deep with ſtrong earth; upon this lay more dung, about ten inches thick; then another layer of earth; ſtill drawing in the ſides of the bed, ſo as to form it like the ridge of an houſe, which may be done by three layers of dung and as many of earth. When the bed is finiſhed it ſhould be covered with litter, to keep out the wet, and prevent its drying; in this ſituation it may remain eight or ten days, by which time it will be of a proper degree of warmth; the litter ſhould then be taken off, the ſides of the bed ſmoothed, and a covering of light rich earth ſhould be laid over the bed; upon this the ſmall roots or off-ſets of the muſhrooms ſhould be put, placing them two or three inches aſunder; then gently cover them about half an inch thick with the ſame light earth; and again put on the covering of litter. The great ſkill in managing theſe beds, is that of keeping them in a proper temperature of moiſture. By this means muſhrooms may be produced all the year; and when the beds are deſtroyed, the ſurface which contains the duſt and roots of the muſhrooms, ſhould be laid by in a dry place for a freſh ſupply, till the proper time of uſing it.

MUSIC, is one of the ſeven ſciences, commonly called liberal, and comprehended alſo among the mathematical, as having for its object diſcrete quantity or number, but not conſidering it in the abſtract like arithmetic, but in relation to time and ſound, in order to make a delightful harmony: or it is the art of diſpoſing and conducting ſounds conſidered as acute and grave; and proportioning them among themſelves, and ſeparating them by juſt intervals pleaſing to the ſenſe.

Mr. Malcolm defines it a ſcience that teaches how ſound, under certain meaſures of time and tune, may be produced; and ſo ordered and diſpoſed, as either in conſonance (i. e. joint ſounding) or ſucceſſion, or both, they may raiſe agreeable ſenſations.

MUSK, a dry, light, and friable ſubſtance, of a dark blackiſh colour, tinged with purple; it is a kind of perfume of a very ſtrong ſcent, and only agreeable when in a very ſmall quantity, or moderated by the mixture of ſome other perfume. It is found in a kind of bag or tumour which grows under the belly of a wild beaſt called moſchus. See MOSCHUS. Muſk is brought to us ſewed up in a kind of bladders or caſes of ſkin of the bigneſs of a pigeon's egg, or larger, each containing from two or three drams to an ounce of muſk. Theſe are covered with a browniſh hair, and are the real capſules in which the muſk is lodged while on the animal. That which is unadulterated appears in maſſes, of looſe and friable granules, which are ſoft to the touch, and eaſily crumble between the fingers, feeling ſomewhat ſmooth and unctuous.

Muſk taken inwardly produces eaſe from pain, quiet ſleep, and a copious diaphoreſis: hence it has been found of great uſe in ſpaſmodic diſorders, petechial, malignant, putrid fevers, the jail diſtemper, hiccoughs, &c. and Dr. Wall obſerves, that it has been found uſeful in ſpaſmodic diſorders, given by way of clyſter. The operation of muſk in ſome reſpects reſembles that of opium; but it does not leave behind it any ſtupor or languidneſs, which the other often does. Muſk ſeems likely to anſwer in thoſe low caſes where ſleep is much wanted, and opiates are improper. It is ſaid to be beſt given in a bolus, in which form thoſe who are moſt averſe to perfumes, may take it without inconvenience. Fifteen grains or more are now given in a doſe with great ſucceſs.

MUSKET, a fire-arm borne on the ſhoulder, and uſed in war. The length of the muſket is fixed at three feet eight inches from the muzzle to the pan, and it carries a ball of ſixteen to the pound.

MUSKETOON, a kind of ſhort thick muſket, whoſe bore is the thirty-eighth part of its length: it carries five ounces of iron, or ſeven and a half of lead,

lead, with an equal quantity of powder. This is the ſhorteſt ſort of blunderbluſſes. See the article BLUNDERBUSS.

MUSLIN, a fine thin ſort of cotton-cloth, which bears a downy knap on its ſurface. There are ſeveral ſorts of muſlins brought from the Eaſt-Indies, and more particularly from Bengal; ſuch as doreas, betelles, mulmuls, tanjeebs, &c.

MUSTARD, *Sinapis*, in botany. See the article SINAPIS.

MUSTER, in the marine, a ſummoning together the crew of any particular ſhip, and calling them ſeverally over by their names.

MUTE, in grammar, a letter which yields no ſound without the addition of a vowel.

MUTILATION, the retrenching or cutting away any member of the body.

This word is alſo extended to ſtatues and buildings, where any part is wanting, or the projecture of any member, as a corniche or an impoſt, is broken off.

MUTULE, in architecture, a kind of ſquare modillion ſet under the corniche of the Doric order. See DORIC.

The only difference between the mutule and modillion conſiſts in this, that the former is uſed in ſpeaking of the Doric order, and the latter in the Corinthian.

MUZZLE *of a Gun or Mortar*, the extremity at which the powder and ball is put in; and hence, the muzzle-ring is the metalline circle, or moulding, that ſurrounds the mouth of the piece.

MYAGRUM, in botany, a genus of plants, the corolla whereof conſiſts of four plane, roundiſh, obtuſe petals, diſpoſed croſs-wiſe, and narrower than the ungues. The fruit is a bivalve turbinato-cordated ſmall pod, lightly compreſſed and rigid, with the apex ending in a conical rigid ſtyle; the ſeeds are roundiſh.

MYGINDA, in botany, a genus of plants, whoſe flower contains four roundiſh, plane, ſpreading petals, with four ſubulated filaments topped with roundiſh antheræ. The fruit is a globoſe drupe, containing an acute oval nut.

MYLOGLOSSUM, in anatomy, is, according to Heiſter, no more than a part of the mylohyoides, though other anatomiſts make it a diſtinct pair of muſcles, thus called becauſe it ariſes about the back-ſide of the molares, and is inſerted into the ligament of the tongue, helping to pull it upwards; being the ſame with what Cowper calls ſtylogloſſum.

MYLOHYOIDÆUS, in anatomy, one of the five pair of muſcles belonging to the os hyoides. The mylohyoidæus ariſes with a large baſe from the bottom of the lower jaw, near the chin, and terminates at the baſe of the os hyoides. See the article HYOIDES.

Beſides the common uſe aſcribed to this muſcle, which is to move the hyoides, the tongue, and the larynx, both upwards, inwards, and ſideways, its ſeries of tranſverſe fibres have a farther uſe, when it is at reſt; and that is, to compreſs the glands under the tongue, and by this means promote the diſcharge of the ſaliva into the mouth from the lower ſalival ducts: whence it is we uſe this muſcle, when we want ſaliva in the mouth.

MYOLOGY, μυολογια, that part of anatomy which treats of the muſcles of the human body.

MYOPIA, or MYOPIAS, ſhort-ſightedneſs, a ſpecies of viſion, wherein objects are ſeen diſtinctly only at ſmall diſtances; which is incident to perſons who have the cornea or cryſtalline, or either of them, too convex.

MYOSOTIS, in botany, a genus of plants whoſe flower is monopetalous and ſaucer-ſhaped; the limb is cut into five parts, and the edges are emarginated: in the bottom of the cup are placed four ſmooth, acuminated, oval ſeeds.

MYRIAD, a term ſometimes uſed to denote ten thouſand.

MYRICA, in botany, a genus of the dioecia claſs of plants; the male flowers are produced in an oblong oval amentum, imbricated on every ſide; the female flowers have no corolla; the piſtillum is an oval germen, with two ſlender ſtyles; the fruit is an unilocular berry, containing a ſingle ſeed.

MYRIOPHYLLUM, in botany, a genus of plants, producing male and female flowers on the ſame plant; the male flower has no corolla; the cup is compoſed of four oblong erect leaves, and the ſtamina are eight hairy filaments, terminated with oblong antheræ; the female flower is like the male, and contains four oblong germina, which afterwards become four oblong ſeeds.

MYRISTICA, the nutmeg-tree, in botany. See NUTMEG.

MYRMECIA, or FORMICA, a painful kind of wart, with a broad baſe, and deeply rooted; growing on the palms of the hands, and ſoles of the feet.

MYROBALANS, a kind of medicinal fruit, brought from the Indies, of which there are five kinds: 1. the citrine, of a yelloviſh red, hard, oblong, and the ſize of an olive: 2. the black or Indian myrobalan, of the bigneſs of an acorn, wrinkled, and without a ſtone: 3. chebulic myrobalans, which are of the ſize of a date, pointed at the end, and of a yelloviſh brown: 4. emblic, which are round, rough, the ſize of a gall, and a dark brown: and, 5. belleric, which are hard, round, of the ſize of an ordinary prune, leſs angular than the reſt, and yellow.

Each of theſe kinds are ſlightly purgative and aſtringent; but Quincy obſerves, that the beſt of them are not worth regarding, ſince they rather clog than aſſiſt any compoſition.

MYRRH,

MYRRH, a vegetable production of the gum or reſin kind, iſſuing by inciſion, and ſometimes ſpontaneouſly, from the trunk and larger branches of a tree growing in Egypt, Arabia, and Abiſſinia. The inciſions are made twice a year, and the myrrh oozing out, is received on ruſh mats diſperſed underneath.

Myrrh is ſent over to us in looſe granules of various ſizes, from that of a pepper-corn to the bigneſs of a walnut. The generality of them, however, is from the ſize of a pea, to a little more than that of a horſe-bean: theſe are ſometimes roundiſh, but often irregularly long and contorted.

The colour of myrrh is a reddiſh brown, with more or leſs of an admixture of yellow, and in the pureſt pieces it is ſomewhat tranſparent. Its taſte is bitter and acrid, with a peculiar aromatic flavour, but very nauſeous: but its ſmell, though ſtrong, is not diſagreeable. It is to be choſen in clear pieces, light, friable, and of the bittereſt taſte.

Myrrh is of great uſe in medicine; it powerfully reſolves and attenuates thick and viſcid blood, concreted bile, and glutinous humours; it is good in obſtructions of the menſes, and in infarctions of the viſcera. It alſo promotes delivery, and expulſion of the ſecundines; it is good in aſthmas, and in caſes of tubercles of the lungs; it is of great ſervice in the jaundice, and in cachectic complaints; it deſtroys worms, ſtrengthens the ſtomach, and diſſipates flatulencies.

Externally applied, it is diſcutient and vulnerary; it cleanſes old ulcers, and diſpoſes them to heal; but it gives many people the head-ach: and as it promotes diſcharge of blood, ſhould never be given to perſons ſubject to ſuch diſcharges, as ſpitting of blood, or the like, or to women in the time of their pregnancy. It is adminiſtered either in pills, boluſes, or tinctures; it not conveniently agreeing with any other forms.

MYRSINE, in botany, a genus of plants whoſe flower conſiſts of a ſingle petal, divided into five ſemi-oval, obtuſe, and connivent petals: the fruit is a roundiſh depreſſed berry, containing five cells, with a ſingle ſeed in each.

MYRTIFORM, in anatomy, an appellation given to ſeveral parts, from their reſembling myrtle-berries: thus we meet with the myrtiform caruncles, and the myrtiform muſcle of the noſe, which ariſes near the inciſorius of the upper lip, and is inſerted into the alæ of the noſe.

MYRTLE, *Myrtus*, in botany, a genus of plants, the flower of which conſiſts of a monophyllous cup, in which is inſerted five large oval petals, with a great number of hairy filaments topped with ſmall antheræ: the fruit is an oval berry, with three cells, containing in each a kidney-ſhaped ſeed.

There are ſeveral ſorts of myrtle, ſuch as the broad-leaved myrtle, narrow-leaved myrtle, nutmeg myrtle, orange myrtle, variegated myrtle, with ſeveral other varieties. They may be all propagated from cuttings, or ſlips, in the ſummer; making choice of the moſt vigorous ſhoots of the ſame year's growth: they ſhould be planted in pots and covered with glaſſes, which prevents the air from getting at them, and facilitates their taking root. When winter comes on, they ſhould be removed into a green-houſe; and the ſpring following, they may be tranſplanted ſingly into ſmall pots. In hot weather they ſhould have plenty of water.

Myrtle-berries are rough and aſtringent, not much preſcribed in compoſition for inward uſe, but they enter ſeveral ſtrengthening plaiſters; the ſyrup of them is eſteemed good againſt abortion, and in fluxes of all kinds.

MYRTUS, the myrtle. See MYRTLE.

MYSTERY, ſomething ſecret or concealed, impoſſible or difficult to comprehend.

MYSTICAL, ſomething myſterious or allegorical.

Some of the commentators upon the ſacred writings, beſides a literal, find alſo a myſtical meaning. The ſenſe of ſcripture, ſay they, is either that immediately ſignified by the words and expreſſions in the common uſe of language; or it is mediate, ſublime, typical, and myſtical. The literal ſenſe they again divide into proper literal, which is contained in the words taken ſimply and properly; and metaphorical literal, where the words are to be taken in a figurative and metaphorical ſenſe. The myſtical ſenſe of ſcripture they divide into three kinds: the firſt, correſponding to faith, and called allegorical; the ſecond, to hope, called anagogical; and the third, to charity, called the tropological ſenſe: and ſometimes, they take the ſame word in ſcripture in all the four ſenſes; thus the word Jeruſalem, literally ſignifies the capital of Judæa; allegorically, the church militant; tropologically, a believer; and anagogically, heaven. So that paſſage in Geneſis, *let there be light, and there was light*, literally ſignifies corporeal light; by an allegory, the Meſſiah; in the tropological ſenſe, grace; and anagogically, beautitude, or the light of glory. See the articles ANAGOGICAL, &c.

MYSTICS, a religious ſect, diſtinguiſhed by their profeſſing a pure, ſublime, and perfect devotion, with an intire diſintereſted love of God, free from all ſelfiſh conſiderations, and by their aſpiring to a ſtate of paſſive contemplation.

MYTHOLOGY, *μυθολογια*, the hiſtory of the fabulous gods and heroes of antiquity, with the explanations of the myſteries and allegories couched therein.

Lord Bacon thinks, that a great deal of concealed inſtruction and allegory was originally intended in moſt part of the ancient mythology: he obſerves, that ſome fables diſcover a great and evident ſimilitude, relation, and connection, with the thing they ſignify; as well in the ſtructure of the fable, as in

the meaning of the names, whereby the perſons or actors are characterized.

The ſame writer thinks, it may paſs for a farther indication of a concealed and ſecret meaning, that ſome of theſe fables are ſo abſurd and idle in their narration, as to ſhew an allegory even afar off: but the argument of moſt weight upon this ſubject he takes to be this, that many of theſe fables appear by no means to have been invented by the perſons who relate them: he looks on them not as the product of the age, nor invention of the poets, but as ſacred relics (as he terms them) gentle whiſpers, and the breath of better times, that from the tradition of more ancient nations, came at length into the flutes and trumpets of the Greeks. He concludes, that the knowledge of the early ages was either great or happy: great, if they by deſign made this uſe of trope and figure; or happy, if, whilſt they had other views, they afforded matter and occaſion to ſuch noble contemplations.

N.

N The thirteenth letter, and tenth conſonant of our alphabet: it is a liquid, the ſound of which is formed by forcing the voice ſtrongly through the mouth and noſtrils; being at the ſame time intercepted by applying the tip of the the tongue to the fore-part of the palate, with the lips open. It ſuffers no conſonant immediately after it, in the beginning of words and ſyllables; nor any before it, except *g*, *k*, and *s*; as in *gnaw*, *know*, *ſnow*, &c.

As a numeral, N ſtands for 900; and with a daſh over it, thus $\bar{N}$, for 900,000.

N. or N°. ſtands for *numero*, i. e. in number; and N. B. for *nota bene*, note well, or obſerve well.

Among the ancient Romans, N. denotes Nepos, Nonnius, &c. N. C. Nero Cæſar, or Nero Claudius; N. L. Non Liquet; N. P. Notarius Publicus; and N B L. ſtands for nobilis.

NADIR, in aſtronomy, that point of the heavens which is diametrically oppoſite to the zenith, or point directly over our heads.

The zenith and nadir are the two poles of the horizon. See HORIZON and POLE.

Sun's NADIR, in aſtronomy, is the axis of the cone formed by the earth's ſhadow: it is thus called, becauſe being produced, it gives a point in the ecliptic diametrically oppoſite to the ſun.

NAHUM, or *the Prophecy of* NAHUM, a canonical book of the Old-Teſtament.

Nahum, the ſeventh of the twelve leſſer prophets, was a native of Elkoſhai, a little village of Gallilee. The ſubject of his prophecy is the deſtruction of Nineveh, which he deſcribes in the moſt lively and pathetic manner; his ſtile is bold and figurative, and can hardly be exceeded by the moſt perfect maſters of oratory. This prophecy was verified at the ſiege of that city by Aſtyages, in the year of the world 3378, 622 years before Chriſt.

The time of Nahum's death is unknown: the Greek menologies, and the Latin martyrologies, place his feſtival on the firſt of December.

NAIADS, in mythology, the nymphs of the fountains. See NYMPH.

NAJAS, in botany, a genus of plants, the male corolla of which is monopetalous, and divided into four ſegments at the limb: the female one has no flower-petals: the fruit is an oval capſule, containing ovato-oblong ſeeds.

NAIL, *Unguis*, in anatomy, a kind of bony exceſcence, growing on the fingers and toes of men, and ſeveral other animals.

The number, figure, ſize, and colour of the nails, need no explanation. The ſeveral parts of the

the nails have their ſeveral names: the extremity is called the apex; the oppoſite part of this is the root or baſe; near which there is a white part, called the lunula, from its figure ſomewhat reſembling a ſegment of a circle.

As to the ſubſtance of the nails, they are compoſed of the cutaneous papillæ, elongated and indurated, and firmly connected to one another in a longitudinal direction; for this reaſon, they are very ſenſible at the roots, where theſe papillæ are yet tender; but at the apex, where they are perfectly indurated, they may be cut without pain.

The papillæ, of which the nails are formed, ariſe out of the ſkin, not only at the root of the nail, but all over the greater part of its under ſurface. It is by this means, that the nails are ſo firmly connected to the ſkin; and it is owing to the continual acceſſion of more and more papillæ, as they approach towards the apex, that they become harder and firmer in that part. They may eaſily be ſeparated intire, from dead ſubjects, by hot water.

NAILS, in building, &c. ſmall ſpikes of iron, braſs, &c. which being drove into wood, ſerve to bind ſeveral pieces together, or to faſten ſomething upon them.

NAIL, is alſo a meaſure of length, containing the ſixteenth part of a yard.

NAKED, in architecture, is the ſurface or plane from whence the projectures ariſe, or which ſerves as a ground to the projectures. Thus we ſay, the foliages of a capital ought to anſwer to the naked of a column, and that a pilaſter ought to exceed the naked of the wall by ſo many inches.

NAKED FIRE, in chemiſtry, is an open fire, or one where a veſſel is immediately expoſed to the fire.

NAKED SEEDS, in botany, are thoſe that are not incloſed in any pod or caſe.

NAMA, in botany, a genus of plants whoſe flower conſiſts of a pentaphyllous cup, and five ovate patent petals: the fruit is an oval bivalvular capſule, having one cell, which contains a great number of very ſmall ſeeds.

NAMUR-MARBLE, a name given by our artificers to a ſpecies of black marble, which is very hard, and capable of a good poliſh, but has no variegations of any other colour.

It is common in Italy, France, and Germany, and is the ſpecies called the lucullean marble by the Romans.

NAPE, a name uſed for the hind part of the neck, ſuppoſed to be on account of the ſhort hair growing there, in reſemblance of the nap of a cloth.

NAPHTHA, in natural hiſtory, a fluid mineral body, of a thin conſiſtance, bright and pellucid, of a ſtrong ſmell, very readily inflammable, and when pure, burning away without leaving any reſiduum.

NAPLES-YELLOW, the common name in the colour-ſhops of London, and among our painters, for the ochre called Giallolino.

NARCISSUS, the daffodil, in botany, a genus of bulbous-rooted plants, the flower of which comes out of an oblong, obtuſe, compreſſed ſpatha, which opens on the ſide, and withers: the corolla conſiſts of a nectarium, formed of one leaf, of a cylindric or funnel ſhape, coloured at the top, and curled or plicated at the brim; and of ſix oval, acuminated, plane petals, affixed externally to the tube of the nectarium, above its baſe: the ſtamina are ſix ſubulated filaments, joined to the nectarium, but ſhorter; theſe are topped with oblong antheræ: the fruit is a roundiſh capſule, obtuſely trigonal, having three cells, which are filled with globoſe ſeeds.

There are various ſorts of the narciſſus; ſome of which are much admired for their ſweet ſcent. The roots are planted in autumn, and are frequently blown in glaſſes with water, in rooms, during the ſpring.

The root of the common daffodil is emetic, vulnerary, and detergent.

NARCOTICS, in medicine, ſoporiferous medicines, which excite a ſtupefaction.

Narcotics, called alſo hypnotics, anodynes, or ſtupefactives, are ſaid by Hoffman, to be ſuch kind of remedies as, by their ſubtile, noxious, and deleterious exhalations, diminiſh or quite deſtroy the ſenſe and motion of the ſolid parts. Among narcotics the moſt eminent are thoſe which are uſually prepared for medicinal uſes of the whole poppy, eſpecially opium; as alſo all thoſe prepared of mandragoras, hyoſcyamus, ſtramonium, and datura. Theſe, ſays the abovementioned author, are not without reaſon reckoned poiſons, ſince they exert their noxious influence in a ſhort ſpace of time, when taken in a ſmall quantity; and a quantity a little larger than ordinary proves mortal. Beſides, their principal operation is on the moſt noble parts of the body, which are the organs of ſenſe and motion; and moreover, they act by means of an element quite oppoſite to nature, a noiſome ſulphureous vapour, by which they diminiſh to a conſiderable degree, or quite deſtroy the ſenſe and motion of the motive fibres. The elements by which narcotics act, are of an highly volatile and penetrating nature, ſince they deeply inſinuate themſelves like a vapour into the pores of the membranes and nerves, and by contaminating that moſt pure and moveable fluid, deprive by little and little, the ſolids of their tone and motion.

Narcotics act on the nervous membranes of the ſtomach and inteſtines, principally by means of a vaporous and fetid ſulphur; for as the ſtomach and inteſtines firſt and immediately feel the force and efficacy of remedies, they are ſo much the more liable to ſuffer from the influence of medicines which are of a ſtronger and more penetrating nature than ordinary. Theſe medicines have alſo a mighty influence on the membranes of the brain, where, by greatly diminiſhing the ſpring and ſyſtole of the

arteries

arteries, they cauſe ſtagnation of their blood therein, with diſtenſions of the veſſels of the head, by which means they induce a torpor, drowſineſs, deliriouſneſs, with frightful and troubleſome dreams. Theſe medicines were therefore ſuſpected, by the wiſeſt phyſicians among the antients, in the cure of diſeaſes, on account of their deleterious quality.

NARDUS, SPIKENARD, in botany, a genus of plants, the corolla whereof is formed of two valves; the exterior is long and of a lanceolato-linear figure; it terminates in an ariſta or awn, and contains within it the other, which is ſmaller, and terminates in a ſhorter awn: the ſeed is ſingle, of a linear oblong figure, narrower at top than at bottom, and pointed at each end; the corolla ſurrounds it by way of a pericarpium.

This plant is cephalic and ſtomachic; it is recommended in nephritic caſes, and as a promoter of the menſes. It is alſo given in chronic caſes to remove obſtructions of the viſcera: however, the modern practice does not uſe it much, except as an ingredient in ſome of the officinal compoſitions. It has a very fragrant aromatic ſmell and taſte.

NARRATION, in oratory and hiſtory, a recital or rehearſal of a fact as it happened, or when it is ſuppoſed to have happened.

Narration is of two kinds, either ſimple or hiſtorical, as where the auditor or reader is ſuppoſed to hear or read of a tranſaction at ſecond hand; or artifical and fabulous, as where their imaginations are raiſed, and the action is as it were re-acted before them. The narration, according to the writers of rhetoric, makes the ſecond part of a juſt ſpeech or harangue, *viz.* that immediately following to the exordium. It makes the whole hiſtory, abating for the occaſional reflections, epiſodes and digreſſions. Cicero requires four virtues in a narration, *viz.* perſpicuity, probability brevity and ſweetneſs. The narration is rendered perſpicuous by obſerving the order of time, by uſing none but proper and known terms, and by reciting the action uninterruptedly. It is rendered probable by the credibility of the narrator, by the ſimplicity and openneſs of the narration, by avoiding every thing far remote from the common ſenſe and opinion of mankind, and by a preciſe detail of circumſtances. It is rendered brief by taking it up no higher than is neceſſary, nor fetching it back; and by avoiding trivial circumſtances. Laſtly it is rendered ſweet by uſing ſmooth numerous, and well ſounding words; by arranging them ſo as to avoid any hiatus or claſhing; by the greatneſs, the novelty, and unexpectedneſs of the things related; and by enriching it with tropes and figures.

NARRATION, in poetry, is uſed for the action, or event, thar make the ſubject of an epic poem.

NARWAL, in icthyology, the unicorn fiſh, ſo called from a long wreathed tooth, ten or more feet in length, which has more the appearance of a horn than a tooth; though it be really a tooth fixed in the gomphoſis of the upper jaw, altogether in the manner of other teeth: hence ſome have called it monodon, which is certainly a more proper name than that of the unicorn fiſh.

The narwal is a fiſh of the whale kind, often growing to twenty-five feet in length, but is more commonly found from ſixteen to twenty.

NASIAS, in anatomy, a thin bone making the upper part of the noſe. See the article NOSE.

NATES, in anatomy, a term expreſſing thoſe two fleſhy exterior parts of the body, vulgarly called the buttocks.

NATES CEREBRI, two circular protuberances of the brain, ſituated on the back ſide of the medulla oblongata, near the cerebellum.

NATION, a collective term, uſed for a conſiderable people inhabiting a certain extent of land, confined within fixed limits, and under the ſame government.

NATIVE, a perſon conſidered as born in a certain place which was the proper reſidence of his parents, and where he received his education.

NATIVE, or NATIVUS, in our ancient law-books, ſignifies a perſon born in the ſtate of villainage, in contradiſtinction to a bonds-man, or one who became a villain by his own act and deed.

NATIVITY, or NATAL-DAY, the day of a perſon's birth. The word nativity is chiefly uſed in ſpeaking of the ſaints, as the nativity of St. John the Baptiſt, *&c.* But when we ſay the Nativity, it is underſtood of that of Jeſus Chriſt, or the feaſt of Chriſtmas, See the article CHRISTMAS.

NATIVITY, in old law-books, ſignifies villainage or ſervitude.

NATIVITY, in aſtrology, the ſituation of the heavens, and particularly of the twelve houſes at the moment of a perſon's birth.

NATRUM, the nitre of the antients, in natural-hiſtory, is a genuine, pure and native ſalt, extremely different from our nitre, and indeed from all the other native ſalts; it being a fixt alkali, plainly of the nature of thoſe made by fire from vegetables, yet capable of a regular cryſtallization, which thoſe ſalts are not. It is found on the ſurface of the earth, or at very ſmall depths within it, and is naturally formed into thin and flat cakes or cruſts, which are of a ſpungy or cavernous ſubſtance, very light and friable, and when pure, of a pale browniſh white; but as its ſpungy texture renders it very ſubject to be fouled by earth received into its pores, it is often met with of a deep dirty-brown, and not unfrequently reddiſh.

NATURAL, in general, ſomething that relates to nature.

Natural-children are thoſe born out of lawful wedlock.

The natural functions, are those actions whereby the aliments are changed and assimilated so as to become a part of the body.

NATURAL HISTORY, a description of the productions of the earth, air, water, &c.

NATURAL INCLINATIONS, are the tendencies of our minds toward things seemingly good. See the articles GOOD and PASSIONS.

NATURAL PHILOSOPHY, that which considers the powers and properties of natural bodies, and their mutual actions on one another.

The business of natural philosophers, says Boerhaave, is to communicate a solid and accurate knowledge of all the bodies in being, and all the affections thereof. Nor can this science be acquired otherwise than by observing, by means of our senses, all the objects which the author of nature has made cognizeable thereto: hence the first and principal part of this science is to collect all the manifest and sensible appearances of things, and reduce them into a body of natural history. Now there are two ways of making such observations; the first when we view things nearly as they happen to turn up, without any design or intervention of our own; in which way no great improvements can be expected in the art, because chance having here the direction, only exhibits occasional or extemporary properties: the other method is, when, after a thorough acquaintance with bodies, we apply them to other bodies equally known, diligently attending to the result, and observing whether any thing new arises. See the article EXPERIMENTAL PHILOSOPHY.

NATURAL, in music, is a term variously used: thus natural music is the same with vocal, in opposition to artifical music, or that performed on instruments. A song is also called natural, when its notes move easily and gracefully, the voice or instrument being no wise forced or strained. Natural harmony is that produced by the natural and essential chord of the mode.

A natural note is used to contradict those flats and sharps that are used at the beginning of a stave; and in such case, it must be taken exactly as in the gamut.

NATURAL, in heraldry, is when animals, fruits, flowers, &c. are blazoned with their natural colours.

NATURALIST, a person well versed in the study of nature, and the knowledge of natural bodies, especially in what relates to animals, vegetables, metals, minerals, and stones. See the article NATURAL PHILOSOPHY.

NATURALIZATION, in law, the act of naturalizing an alien, or placing him in the condition of a natural born subject. In England, this is done by act of parliament; but none can be naturalized before they have received the sacrament of the church, and taken the oaths of allegiance and supremacy. A person who is naturalized may have lands by descent, as heirs at law, as well as obtain them by purchase: but they are disabled from being of the king's privy council, or of holding offices, 7 Jac. I. 12 W. III. c. 2. By a late statute it is ordained, that all children born out of the king's dominions, whose fathers were or are natural subjects to this kingdom at the time of their birth, shall be adjudged natural-born subjects of this realm, except children of parents who are attainted of treason, or that are in the actual service of a foreign prince at enmity with us. 4 Geo. II. c. 2. By an act of 13 Geo II. all Jews who have resided in the British colonies in America, without being absent two months at any one time, are declared naturalized without their receiving the sacrament of the Lord's supper.

NATURALS, *res naturales*, among physicians, whatever naturally belongs to an animal, in opposition to non-naturals. See the article NON-NATURALS.

NATURE, *Natura*, according to Mr. Boyle, has eight different significations; it being used, 1. For the author of nature, whom the schoolmen call *Natura Naturans*, being the same with God. 2. By the nature of a thing, we sometimes mean its essence; that is, the attributes which make it what it is, whether the thing be corporeal or not; as when we attempt to define the nature of a fluid, of a triangle, &c. 3. Sometimes we confound that which a man has by nature, with what accrues to him by birth; as when we say, that such a man is noble by nature. 4. Sometimes we take nature for an internal principle of motion; as when we say, that a stone by nature falls to the earth. 5. Sometimes we understand, by nature, the established course of things. 6. Sometimes we take nature for an aggregate of powers belonging to a body, especially a living one; in which sense physicians say, that nature is strong, weak, or spent; or that, in such and such diseases, nature left to herself will perform the cure. 7. Sometimes we use the term nature for the universe, or whole system of the corporeal works of God; as when it is said of a phœnix, or chimera, that there is no such thing in nature. 8. Sometimes too, and that most commonly, we express by the word nature a kind of semi-deity, or other strange kind of being.

If, says the same philosopher, I were to propose a notion of nature, less ambiguous than those already mentioned, and with regard to which many axioms, relating to that word, may be conveniently understood, I should first distinguish between the universal and the particular nature of things. Universal nature I would define to be the aggregate of the bodies that make up the world, in its present state, considered as a principle; by virtue whereof they act and suffer, according to the laws of motion, prescribed by the author of all things. And this makes way for the other subordinate notion;

since the particular nature of an individual consists in the general nature, applied to a distinct portion of the universe; or, which is the same thing, it is a particular assemblage of the mechanical properties of matter, as figure, motion, &c.

NAVAL, relating to a ship, whence

NAVAL ARMAMENT, the same with fleet of ships of war, which see.

NAVAL CAMP, in antiquity, a fortification, consisting of a ditch and parapet on the land side, or a wall built in the form of a semi circle, and extended from one point of the sea to another. This was sometimes defended with towers, and beautified with gates, through which they issued forth to attack their enemies. Homer hath left us a remarkable description of the Grecian fortifications of this sort in the Trojan war, of which we shall present our readers with Mr. Pope's translation.

Then to secure the camp and naval pow'rs,
They rais'd embattled walls with lofty tow'rs;
From space to space were ample gates around,
For passing chariots, and a trench profound
Of large extent; and deep in earth below,
Strong piles infix'd stood adverse to the foe.

Towards the sea, or within it, they fixed great piles of wood, like those in their artificial harbours; before these the vessels of burthen were placed, in such order, as that they might be instead of a wall, and give protection to those within: in which manner Nicias is reported by Thucydides to have encamped himself. But this seems only to have been practised when the enemy was thought superior in strength, and raised great apprehensions of danger in them.

When their fortifications were thought strong enough to defend them from the assaults of enemies, it was frequent to drag their ships to shore, which the Greeks called ἑνωλκειν, the Romans *subducere*. Around the ships the soldiers disposed their tents; as appears every where in Homer: but this seems only to have been practised in winter, when their enemies fleet was laid up, or could not assault them, or in long sieges, and when they lay in no danger from their enemies by sea, as in the Trojan war, where the defenders of Troy never once attempted to encounter the Grecians in a sea-fight.

The adjacent places were usually filled with inns and stews, well stocked with females, that prostituted themselves to the mariners, merchants, and artificers of all sorts, who flocked thither in great numbers; this, however, appears to be only in times of peace.—*Potter's Antiquities of Greece.*

NAVE, in architecture, the body of a church, where the people are disposed, reaching from the ballustter, or rail of the choir, to the chief door.

Some derive the word nave from ναος, a temple; and others from ναυς, a ship, by reason the vault or roof of a church bears some resemblance to a ship.

NAVEL, *Umbilicus*, in anatomy, the center of the lower part of the abdomen; being that part where the umbilical vessels passed out of the fœtus to the placenta of the mother.

The navel-string, or funiculus umbilicalis, of the fœtus, besides its vein and two arteries, is composed of a spongy substance, in which these vessels are lodged, which upon entering the placenta, are divided into numerous branches, and lesser ramifications.

As soon as the infant and after-burden are delivered, a firm ligature is made upon the navel-string, with a strong thread folded several times together, and about two or three fingers-breadth from the abdomen: this done, the navel-string leading to the placenta is to be cut off, and the wound dressed with lint, till the part on which the ligature was made, becoming dry, falls off of itself.

NAVEL-WORT, *Cotyledon*, in botany. See the article COTYLEDON.

NAVEW, in botany. See the article RAPE-SEED.

NAVICULARE Os, in anatomy, a bone of the foot, lying between the astragalus and ossa cuneiformia, and so called from its resemblance to a boat. It has a glenoid cavity, for its articulation with the head of the astragalus; and its anterior faces are received into the sinuses of the ossa cuneiformia.

NAVIGATION, the art of conducting or carrying a ship from one port to another. See the article SHIP.

Navigation implies not only the mechanical art of managing the sails, and working a ship; that is, of causing it to observe such motions and directions, as are assigned by the navigator; which must be learned on ship-board, and in the practice of sailing; but likewise the theory thereof, which depends on the navigator's being before-hand furnished with the following elements.

1. A table of the latitudes and longitudes of the most remarkable parts of the sea-coasts, islands, rocks, shoals, &c. in the frequented parts of the world.

2. Maps and charts of the seas and lands, together with the depths of water, and the times and setting of the tides upon the coast he may have occasion to approach near.

3. The use and application of several instruments, necessary to point out the way a ship is to steer, to measure the rate she runs at, and to find the place she is in at any time.

4. A sufficient stock of mathematical learning, to enable him to make a right use of the observations that may be deduced from the preceding elements; but particularly trigonometry. See the article TRIGONOMETRY.

NAVIS, *Argo Navis*, or the ship Argo, in astronomy. See the article ARGO.

NAUMACHIA, in antiquity, a shew or spectacle

tacle among the antient Romans, repreſenting a ſea-fight.

NAUSEA, in medicine, a reaching, or propenſity and endeavour to vomit, ariſing from a loathing of food, excited by ſome viſcous humour that irritates the ſtomach.

In this diſorder the patient is ſo far from deſiring aliment, that he rather loaths it. It either proceeds from a fault in the ſtomach, or elſe is derived from other diſeaſes, or is a ſymptom thereof, particularly acute inflammations, aſthma, dropſy, hypochondriac paſſion, &c. or when the humours are corrupted, and the ſpirits ſuppreſſed, in malignant diſeaſes. Vomitting in this caſe is proper, or purging when that is forbid. To theſe ſhould be joined ſtrengtheners of the ſtomach, and chiefly ſtomachic balſams, made of oil of nutmegs, and diſtilled oils, and ſtomachic plaſters. Hoffman ſays, that there is nothing better than mint, its ſpirituous water, and diſtilled oil; likewiſe maſtic and its ſpirit, or balſam of Peru diſtilled with ſalt of tartar. In acute fevers, eſpecially the malignant, epidemic, and ſpotted, there is generally a naufea and reaching to vomit, for which reaſon emetics are good: likewiſe in the dyſentery, eſpecially when it is epidemic in a camp, emetics are not only uſeful, but neceſſary, with a ſlender diet.

NAUTICAL PLANISPHERE, a deſcription of the terreſtrial globe upon a plane for the uſe of mariners, more uſually called chart. See the article CHART.

NAUTICAL COMPASS, the ſame with mariners compaſs. See COMPASS.

NAUTICUS, in anatomy, is the name of a muſcle, called alſo tibialis poſticus. See the article TIBIALIS.

NAUTILUS, in natural hiſtory, a ſimple ſhell, having no hinge, formed of one continued piece, rolled as it were into a ſpiral form, and having its cavity divided into a great number of cells by tranſverſe partitions, each of which has a perforation, and is continuous to the others, by means of a ſyphunculus carried the whole length of the ſhell. The animal inhabiting this ſhell is a ſepia.

Of the nautili, ſome are thick and ſtrong; others thin, light, and brittle; ſome are aurated, others are not ſo; and ſome are ſmooth on the external ſurface, and others furrowed.

NAVY, the fleet or ſhipping of a prince or ſtate. See FLEET.

NAZAREANS, in church hiſtory, a name originally given to all Chriſtians in general, on account that Jeſus Chriſt was of the city of Nazareth; but afterwards reſtrained to a ſect of heritics, whoſe religion conſiſted of a ſtrange jumble of Judaiſm and Chriſtianity; obſerving at the ſame time the Moſaical law, and the ſeveral rites of the Chriſtian religion.

NAZARITES, among the Jews, perſons who, either of themſelves or by their parents, were dedicated to the obſervation of Nazariteſhip.

They were of two ſorts; namely, ſuch as were bound to this obſervance for only a ſhort time, as a week or month; or thoſe who were bound to it all their lives. All that we find peculiar in the latter's way of life, is, that they were to abſtain from wine, and all intoxicating liquors, and never to ſhave or cut off the hairs of their heads. The firſt ſort of Nazarites were moreover to avoid all defilement; and if they chanced to contract any pollution before the term was expired, they were obliged to begin afreſh. Women as well as men might bind themſelves to this vow.

NEALED, among ſea-men, is uſed when the ſounding is deep water cloſe to the ſhore; as alſo when the ſhore is ſandy, clayey, ooſy, or foul and rocky ground.

NEALING, or rather ANNEALING. See ANNEALING.

NEAP TIDES. See TIDES.

NEAPED. When a ſhip wants water ſo that ſhe cannot get out of the harbour, off the ground, or out of the dock, the ſea-men ſay, ſhe is neaped, or beneaped.

NEAR, or NO NEAR, at ſea, a word of command from him that cons the ſhip to the man at the helm, requiring him to let her fall to the leeward.

NEAT, or NET WEIGHT, the weight of a commodity alone, clear of the caſk, bag, caſe, or even filth.

NEBEL, in the Jewiſh antiquity, the ſame with the pſaltery. See PSALTERY.

NEBULOUS, cloudy, in aſtronomy, a term applied to certain of the fixed ſtars, which ſhew a dim hazy light; being leſs than thoſe of the ſixth magnitude, and therefore ſcarce viſible to the naked eye.

NEBULY, or NEBULEE, in heraldry, is when a coat is charged with ſeveral little figures, in form of words, running within one another; or when the outline of a bordure, ordinary, &c. is indented or waved.

NECESSARY, in a philoſophical ſenſe, that which cannot but be, or cannot be otherwiſe. See the next article.

NECESSITY, whatever is done by a neceſſary cauſe, or a power that is irreſiſtible, in which ſenſe it ſtands oppoſed to freedom. See the article FREEDOM.

The ſchools diſtinguiſh a phyſical neceſſity, and a moral neceſſity; and a ſimply abſolute neceſſity, and a relative one. Phyſical neceſſity, is the want of a principle, or of a natural means neceſſary to act, which is otherwiſe called a phyſical or natural impotence. Moral neceſſity, is only a great diffi-

culty, ſuch as that ariſing from a long habit, a ſtrong inclination, or violent paſſion. Simple or abſolute neceſſity, is that which has no dependence on any ſtate or conjuncture, or any particular ſituation of things, but is found every where, and in all the circumſtances in which the agent can be ſuppoſed; ſuch as in a blind man, the neceſſity he is under of not diſtinguiſhing colours. Relative neceſſity, is that which places a man in a real incapacity of acting or not acting in thoſe circumſtances, and that ſituation he is found in, though in other circumſtances, and in another ſtate of things, he might act or not act; ſuch, in the opinion of the Janſeniſts, is the neceſſity of doing evil, in a man, who, with a violent paſſion, has only a feeble grace to reſiſt it; or the neceſſity of doing well, in a man, who, having grace of ſeven or eight degrees of ſtrength, has only concupiſcence of two or three degrees to withſtand. All theſe kinds of neceſſity are oppoſite to freedom, or liberty; ſince even in the laſt, it is as impoſſible for a man to act or not act, as if he were in a ſtate of abſolute and phyſical neceſſity.

The ſchoolmen admit of other ſpecies of neceſſity, antecedent, concomitant, conſequent, &c. Antecedent neceſſity, is that ariſing from an antecedent cauſe neceſſarily operating; ſuch is the neceſſity of the ſun's riſing to-morrow morning. Concomitant neceſſity, ariſes from the antecedent and neceſſary cauſe, but depends upon the circumſtances of the effect; the effect all the while being free: thus, it is neceſſary Peter ſit, ſuppoſing he is ſitting.

NECK, *Collum*, in anatomy, is that ſlender part ſituated between the head and the trunk of the body.

The neck conſiſts of the following parts: 1. the common integuments: 2. ſeven vertebræ: 3. a number of muſcles, which ſerve to move the head, the neck, the larynx, the pharynx, and the os hyoides: 4. a number of very large arteries, as the carotids, internal and external, and the vertebral ones: 5. of large veins, as the jugular, internal and external, and the vertebral ones: 6. of large nerves, of the par vagum, the intercoſtals, the recurrent, the diaphragmatics, and the vertebral: 7. a part of the ſpinal marrow: 8. the aſpera arteria, or trachea, particularly the larynx, in which is an eminence called the pomum adami: 9. the pharynx, with a part of the oeſophagus: 10. the thyroide, with ſome other ſmaller glands. See LARYNX, PHARYNX, JUGULAR, &c.

Wounds of the NECK. The treatment of theſe wounds ought to be different, according to the different nature of the wound. When the common integuments and muſcular fleſh only are wounded, it will require to be treated in the ſame manner as other ſlight wounds. See the article WOUND.

Where the external jugular is wounded, the methods uſed after bleeding in that vein will be ſufficient. When the internal jugular vein is wounded, the hæmorrhage will be eaſily ſtopped by filling the wound with dry lint, or with the puff-ball or duſty-muſhroom; laying over theſe applications ſquare bolſters, and ſecuring all with a bandage, drawn as tight as the ſituation of the place will admit. Where this method has no effect, the ſurgeon ſhould make a proper preſſure on the wounded part with his finger, till the hæmorrhage is intirely ſtopped; the dreſſings applied are not to be removed for three days, and then a vulnerary balſam and plaſter is to be applied to heal the wound. In large wounds, or an intire diviſion of the internal jugular, the ſurgeon, if preſent, ſhould make a firm preſſure with his finger on the wounded part, and make inciſions lengthwiſe above the wound, till he can get at the veſſel, and then make a firm ligature upon it, by the aſſiſtance of the crooked needle.

In caſe of a wound in the carotid artery, a ſurgeon, if preſent in time, ſhould uſe the ſame method as in thoſe of the internal jugular vein. This method is more likely to be attended with ſucceſs in wounds of the upper and middle part of the veſſel, than in thoſe of the lower part of it; and where the wound is not in the trunk of the artery, but in one of its branches near the head, you ſhould fill up the wound with lint dipt in ſome ſtyptic liquor, and then cover it up with thick compreſſes, ſecuring all with a tight bandage, and ordering an aſſiſtant to make a preſſure upon the part with his hand, for ſome time after: and in theſe caſes, the dreſſings are not to be removed till the third or fourth day.

In curing the wounds of the aſpera arteria, the ſurgeon ought to clean the wound, and then endeavour to unite the parts by the help of ſticking plaſters; or where the wound is large, by making two ſtitches with a crooked needle, dreſſing the wounds afterwards in the uſual manner, and enjoining the patient to keep his head in a proper ſituation. The wound thus treated, will eaſily heal, if it has been made either by puncture, or a cutting inſtrument; but if it has been made by a bullet, and any part of the aſpera arteria is carried away, the ſuture is to no purpoſe: wounds of this kind are only to be dreſſed with the vulnerary balſams. If the aſpera arteria is intirely divided, and the lower end of it has ſhrunk into the cavity of the thorax, ſo that it cannot be laid hold on and united to the upper part, there can be no remedy.

When the oeſophagus is wounded, what is taken in at the mouth comes out through the wound, and the patient is uſually affected with hiccoughs and vomiting. When it is entirely divided, there is no remedy; but when it is only perforated, or wounded in part, the cure may be attempted, by dreſſing it with vulnerary balſams, endeavouring to unite it by means of ſticking plaſters, and enjoining the patient a ſtrict abſtinence for ſome days, giving nouriſhing clyſters of broth or milk; but when the ne-

neceſſities of nature require nouriſhment to be taken by the mouth, the wound ſhould always be carefully cleaned afterwards, and dreſſed daily till it heals.

Wounds of the medulla ſpinalis, are beſt dreſſed with balſam of Peru, or medicines of the like nature, mixed with a ſmall quantity of honey of roſes, ſpread upon pledgits, and applied moderately warm. Slight ones of this kind, are ſometimes healed by this means, but large ones in this part bring on certain death.

Luxation of the NECK. If life remain after ſuch an accident, the patient is to be immediately laid flat on the ground or floor; then the ſurgeon laying hold of his head, is to extend it ſtrongly, gently moving it from ſide to ſide, till he finds that the neck is reſtored to its natural poſture.

Mr. Petit mentions another method, by means of ſlings: but Heiſter gives the preference to the former method, both as being more ſimple, and becauſe the patient can be relieved much ſooner.

Wry NECK, a deformity uſually brought into the world with people; but ſometimes it is occaſioned by accidents afterwards.

When it is from birth, there is very little reaſon to imagine it curable, becauſe the vertebræ of the neck are rendered crooked by that poſture, while the bones are in a ſoft and pliable ſtate.

There are, however, in the writings of ſurgeons, ſome inſtances of this diſorder, even in theſe circumſtances, being cured after twelve, ſixteen, or eighteen years.

When this diſorder comes on adults, it is occaſioned generally by a contraction of the ſkin from a burn on one ſide, or from a ſtrong ſpaſmodic contraction of one of the maſtoide muſcles; which will at length become ſhorter and indurated, by continuing in that poſture; or it may proceed from a relaxation of one or more of theſe muſcles; in conſequence of which, the neck will be contracted by the ſtronger antagoniſt-muſcle on the oppoſite ſide; or, laſtly, it may proceed from a preternatural ligament drawing down the head. And when either of theſe is the occaſion of the diſorder, there is hopes of a cure; eſpecially if the patient be young, and the diſorder not of long ſtanding.

If this diſorder be recent, and cauſed by a defluxion of humours, evacuating medicines, with mild ſudorifics, and heat, may be of ſervice. But when it ariſes from a contraction of the ſkin or muſcles by burning, the repeated uſe of oils, ointments, and fomentations, may relax ſo far as to make a cure. A proper firm bandage muſt be applied to pull the head toward the natural poſture, and a ſteel collar may be contrived, by which the patient will be ſuſpended very frequently till the neck recover its proper poſition. But when all theſe fail, the manual aſſiſtance of the ſurgeon is to be called in.

If the ſkin is contracted by a burn, it muſt be carefully incided tranſverſely in ſeveral places, and the inciſions dreſſed ſo as to keep them open and dilated, and the head pulled to its proper poſition by a bandage, till the new fleſh filling up theſe inciſions, gives room for the head to ſtand even.

But if the wry-neck proceeds from a contraction of one of the maſtoide muſcles, or from ſome ligament, they are to be divided by a tranſverſe inciſion in their lower part, near the clavicle or ſternum.

NECROMANCY, a ſpecies of divination, performed by raiſing the dead, and extorting anſwers from them.

NECROSIS, in medicine, a term ſometimes uſed for a mortification, or ſphacelus.

NECTAR, *νεκταρ*, among ancient poets, the drink of the fabulous deities of the heathens, in contradiſtinction from their ſolid food, which was called ambroſia. See AMBROSIA.

This word is alſo uſed by ſome of the ancients to expreſs honey.

NECTARINE, a well-known fruit, only differing from the peach by having a ſmoother rind and a firmer pulp.

For the management of nectarine-trees, and their generical characters, ſee the article PEACH.

NECTARIUM, among botaniſts, expreſſes what is ſometimes only a part of the corolla, and ſometimes, though more rarely, the whole: it is a part deſtined for the reception of the honey-juice of the plant, and is very various in its figure; being ſometimes only a hollow in a petal, ſometimes a little ſquama or tubercle, and ſometimes only a plain tube.

NEEDLE, *Acus*, a very common little inſtrument or utenſil, made of ſteel, pointed at one end, and pierced at the other; uſed in ſewing, embroidery, tapeſtry, &c.

Needles make a very conſiderable article in commerce, though there is ſcarce any commodity cheaper, the conſumption of them being almoſt incredible. The ſizes are from N°. 1. the largeſt, to N°. 25. the ſmalleſt.

Chirurgeon's NEEDLE. There are many caſes wherein the uſe of the needle is highly neceſſary; in ſome of which, a cure cannot be completed without it, as in wounds of the belly, and in divided tendons.

In amputations they are found much preferable to the actual cautery; and in the operation of the aneuriſm, bubonocele, lithotomy, &c. they very much forward the cure; and in a cataract and hare-lip, the cure is wholly performed by them.

For a deſcription of the different needles uſed in the cure of each of theſe two laſt diſorders, ſee the articles COUCHING and HARE-LIP.

Chirurgical needles are of different figures and ſizes; being ſtraight, crooked, and flat; and all of them

them very ſharp, and moſtly made of well-tempered metal. Thoſe needles uſed for ſetons, and generally for the ſuture of tendons, and for the ſewing up of dead bodies, muſt be ſtraight. In amputation, and all other ſort of wounds, the crooked ſort are uſed.

Mr. Monro, in the Medical Eſſays, obſerves, that needles of ſilver pierce more eaſily in ſtitching arteries, after amputation, than thoſe made of ſteel.

Magnetical NEEDLE, in navigation, a long ſlender bar of ſteel, ſupported upon a ſmall pivot, or center; on which, playing at liberty, it directs itſelf to certain points in or under the horizon; whence the magnetical needle is of two kinds, viz. horizontal, and inclinatory. See the article MAGNET.

Horizontal needles are thoſe equally balanced on each ſide the pivot that ſuſtains them; and which, playing horizontally with their two extremes, point out the north and ſouth points of the horizon. For their application and uſe, ſee the article COMPASS.

In the conſtruction of the horizontal needle, a piece of pure ſteel is provided, of a length not exceeding ſix inches, leſt its weight impede its volubility, very thin, to take its verticity the better, and not pierced with any holes, or the like, for ornament ſake, which prevent the equable diffuſion of the magnetic virtue. A perforation is then made in the middle of its length, and a braſs cap or head ſoldered on, whoſe inner cavity is conical, ſo as to play freely on a ſtyle or pivot headed with a fine ſteel point. The north point of the needle in our hemiſphere, is made a little lighter than the ſouthern; the touch always deſtroying the balance, if well adjuſted before, and rendering the north end heavier than the ſouth, and thus occaſioning the needle to dip.

The method of giving the needle its verticity or directive faculty, has been ſhewn already under the article MAGNET; but if after touching, the needle be out of its equilibrium, ſomething muſt be filed off from the heavier ſide, till it balance evenly.

Needles in ſea-compaſſes are uſually made of a rhomboidal or oblong form: we have given their ſtructure already under the article COMPASS.

The needle is not found to point preciſely to the north, except in very few places, but deviates from it more or leſs in different places, and that too at different times, which deviation is called its declination or variation from the meridian. See the article VARIATION.

Dipping-NEEDLE, a magnetical needle, ſo hung as that, inſtead of traverſing horizontally and pointing out north and ſouth, one end dips or inclines to the horizon, and the other points to a certain degree of elevation above it.

Or a dipping-needle may be defined, with Mr. Whiſton, to be a long ſtraight piece of ſteel, every way poiſed on its center, and afterwards touched with a loadſtone, but ſo contrived as not to play on the point of a pin, as does the common horizontal needle, but to ſwing in a vertical plane, about an axis parallel to the horizon; and this to diſcover the exact tendency of the power of magnetiſm. See DIPPING-*Needle*.

NEEDLE-FISH, a ſpecies of ſyngnathus, with the middle of the body hexangular, and the tail pinnated.

NEEDLE-SHELL, in natural hiſtory, the ſlender turbo, with ventricoſe ſpires, and a ſmall round mouth.

NEGATION, in logic, an act of the mind, affirming one thing to be different from another; as that the ſoul is not matter.

NEGATIVE, in general, ſomething that implies a negation: thus we ſay, negative quantities, negative ſigns, negative powers, &c.

Our words and ideas, ſays Dr. Watts, are ſo unhappily linked together, that we can never know which are negative, which poſitive ideas, by the words that expreſs them: for ſome poſitive terms denote a negative idea, as *dead*; and there are both poſitive and negative terms invented to ſignify the ſame and contrary ideas, as *unhappy* and *miſerable*. To this may alſo be added, that ſome words, which are negative in the original language, ſeem poſitive in Engliſh, as *abyſs*. The way, therefore, to know whether any idea be negative or not, is to conſider whether it primarily implies the abſence of any poſitive being, or mode of being; if ſo, then it is a negative idea, otherwiſe a poſitive one.

According to logicians, the only way to prove a negative, is by converting it into an affirmative.

NEGATIVE PREGNANT, a negative that implies or brings forth an affirmative; as where a perſon is impleaded to have done a certain thing on ſuch a day, &c. and denies the thing generally, without alledging any thing farther; it is a negative pregnant plea, becauſe ſuch plea may nevertheleſs imply that he did it in ſome ſort.

NEGROES, properly the inhabitants of Nigritia in Africa, alſo called blacks and moors; but this name is now given to all the blacks.

The origin of the negroes, and the cauſe of this remarkable difference from the reſt of the human ſpecies, has much perplexed the naturaliſts: Mr. Boyle has obſerved, that it cannot be produced by the heat of the climate: for though the heat of the ſun may darken the colour of the ſkin, yet experience does not ſhew that it is ſufficient to produce a true blackneſs, like that of the negroes.

In Africa itſelf, many nations of Ethiopia are not black, nor were there any blacks originally in the Weſt-Indies. In many parts of Aſia, under the ſame parallel with the African region, inhabited by blacks, the people are but tawney. He adds, that there are negroes in Africa beyond the ſouthern tropic, and that a river ſometimes parts nations, one of

of which is black and the other only tawney. Dr. Barriere alledges, that the gall of negroes is black, and being mixed with their blood, is depoſited between their ſkin and ſcarf-ſkin. However, Dr. Mitchel, of Virginia, in the Philoſophical Tranſactions, N°. 476, has endeavoured, by many learned arguments, to prove, that the influence of the ſun in hot countries, and the manner of life of their inhabitants, are the remote cauſes of the colour of negroes, Indians, &c. and indeed it would be a ſtrong confirmation of his doctrine, if we could ſee any people originally white, become black and woolly by tranſplantation, or *vice verſa*.

Negroes are brought from Guinea, and other coaſts of Africa, and ſent into the colonies in America, to cultivate tobacco, ſugar, indigo, &c. and in Mexico and Peru, to dig in the mines; and this commerce, which is ſcarce defenſible on the foot either of religion or humanity, is now carried on by all the nations that have ſettlements in the Weſt Indies. Thoſe negroes make the beſt ſlaves, who are brought from Angola, Senegal, Cape Verd, the river Gambia, the kingdoms of Joloffes, Daniel, Galland, &c.

There are various ways of procuring them: ſome, to avoid famine, ſell themſelves, their wives, and children, to their princes, or other great men; others are made priſoners of war; and great numbers are ſeized in excurſions made for that very purpoſe by the petty princes upon one another's territories, in which it is uſual to ſweep away all, without diſtinction to age or ſex.

NEHEMIAH, a canonical book of the Old Teſtament, ſo called from the name of its author. Nehemiah was born at Babylon, during the captivity, and ſucceeded Ezra in the government of Judah and Jeruſalem. He was a Jew, and was promoted to the office of cup bearer to Artaxerxes Longimanus, king of Perſia; when the opportunities he had of being daily in the king's preſence, together with the favour of Eſther the queen, procured him the favour of being authorized to repair and fortify the city of Jeruſalem, in the ſame manner as it was before its deſtruction by the Babylonians. On his going to Jeruſalem, he finiſhed the rebuilding of the walls in fifty-two days, and dedicated the gates of the city with great ſolemnity. He then reformed ſome abuſes which had crept in among his countrymen, particularly the extortion of the uſurers, by which the poor were ſo oppreſſed as to be forced to ſell their lands and children for ſupport: after which he returned to Perſia, and came back again with a new commiſſion, by virtue of which he regulated every thing relating both to the ſtate and religion of the Jews. The hiſtory of theſe tranſactions is the ſubject of this book.

NEMÆAN GAMES, were ſo called from Nemæa, a village between the cities of Cleonæ and Philus, where they were celebrated every third year. The exerciſes were chariot-races, and all the parts of the pentathlum. Theſe games were inſtituted in memory of Opheltes, or Archemorus, the ſon of Euphetes and Creuſa, and nurſed by Hypſipyle; who leaving him in a meadow, while ſhe went to ſhew the beſiegers of Thebes a fountain, at her return found him dead, and a ſerpent twined about his neck: whence the fountain, before called Langia, was named Archemorus; and the captains, to comfort Hypſipyle, inſtituted theſe games. Others aſcribe their inſtitution to Hercules, after his victory over the Nemæan lion.

NENIA, or NÆNIA, in ancient poetry, a mournful kind of ſong, filled with the praiſes of ſome deceaſed perſon, and ſung during the celebration of the funeral. See the article FUNERAL.

NEOMENIA, or NOUMENIA, a feſtival of the ancient Greeks, at the beginning of every lunar month, which was, as the name imports, obſerved upon the day of the new-moon, in honour of all the gods, but eſpecially Apollo, who was called Neomenios; becauſe the ſun is the fountain of light, and whatever diſtinction of times and ſeaſons may be taken from other planets, yet they are all owing to him as the original of thoſe borrowed rays by which they ſhine.

NEOPHYTES, new plants, a name given by the ancient Chriſtians to thoſe heathens who had newly embraced the faith; ſuch perſons being conſidered as regenerated, or born anew by baptiſm.

The term neophytes has been alſo uſed for new prieſts, or thoſe juſt admitted into orders, and ſometimes for the novices in monaſteries. It is ſtill applied to the converts made by the miſſionaries among the Infidels.

NEOTTIA, bird's neſt, in botany, a genus of plants, the flower of which conſiſts of five ovato-oblong petals, connivent at the points: the nectarium is undivided, equal in length to the petals, and furniſhed with a denticulation on each ſide: the fruit is a rugoſe oblong capſule, containing a great number of ſeeds.

NEPA, the leſſer furz, in botany, a ſpecies of geniſta ſpartium.

NEPENTHES, in botany, a genus of plants, whoſe flower is apetalous; the calyx is divided into four ſegments, and the filaments are ſcarce viſible, the antheræ joining to the top of the ſtyle. The fruit is an oblong, columnar, truncated capſule, having four cells, which contain a number of chaffy acuminated ſeeds.

NEPER's RODS, or BONES, an inſtrument invented by J. Neper, baron of Marchiſton, in Scotland, whereby the multiplication and diviſion of large numbers are much facilitated.

NEPETA, the tall white ſideritis, or catmint, in botany, a genus of plants, the corolla whereof conſiſts of a ſingle ringent petal, the tube is cylindric and incurvated, and the limb dehiſcent; the faux

is patent, cordated, and terminating in two ſhort ſegments; the upper lip is erect, roundiſh, and emarginated; the lower one is a roundiſh, concave, large, entire and ſerrated; there is no pericarpium, but the ſeeds, which are roundiſh, and four in number, are contained in the cup.

Catmint has been greatly recommended as an uterine and nervous medicine. The people in the country ſtill frequently uſe it in form of an infuſion for theſe purpoſes, but in the ſhops it is only kept as an ingredient in ſome compoſitions.

NEPHEW, a term relative to uncle and aunt, ſignifying a brother's or ſiſter's ſon; who, according to the civil law, is in the third degree of conſanguinity, but according to the canon in the ſecond.

NEPHRITIC, ſomething that relates to the kidneys. See kidneys.

NEPHRITIC STONE, *Lapis Nephriticus*. See STONE.

NEPHRITIC WOOD, *Lignum Nephriticum*, a wood of a very denſe and compact texture, and of a fine grain, brought us from New Spain, in ſmall blocks, in its natutal ſtate, and covered with its bark. It is to be choſen of a pale colour, ſound, and firm, and ſuch as has not loſt its acrid taſte; but the ſureſt teſt of it is the infuſing it in water: for a piece of it infuſed half an hour in cold water, gives it a changeable colour; which is blue or yellow, as variouſly held to the light. If the vial it is in be held between the eye and the light, the tincture appears yellow; but if the eye be placed between the light and the vial, it appears blue. We often meet with this wood adulterated with others of the ſame pale colour; but the duſkiſh black hue of the bark, is a ſtriking character of this.

The tree is the coatli of Hernandez. It grows to the height of our pear-tree, and its wood, while freſh, is much of the ſame texture and colour; the leaves are ſmall and oblong, not exceeding half an inch in length, or a third of an inch in breadth; the flowers are ſmall, and of a pale yellow, and oblong ſhape, ſtanding in ſpikes; the cups they ſtand in are divived into five ſegments at the edge, and are covered with a reddiſh down. This is the beſt deſcription of the tree that can be collected from what has been hitherto written of it; no body having had an opportunity of taking its true characters.

This wood is a very good diuretic, and is ſaid to be of great uſe with the Indians in all diſeaſes of the kidneys and bladder, and in ſuppreſſions of urine, from whatever cauſe. It is alſo recommended in fevers and obſtructions of the viſcera. The way of taking it, among the Indians, is only an infuſion in cold water.

NEPHRITICS, in pharmacy, medicines proper for diſeaſes of the kidneys, eſpecially the ſtone. See STONE.

Such particularly are the roots of althæa, dog's-graſs, aſparagus, ſago, pellitory of the wall, mallows, pimpinella, red chick-peaſe, peach-kernels, turpentine, the nephritic wood, &c. and diuretics. See diuretics, &c.

NEPHRITIS, in medicine, an inflammation of the kidneys.

The ſymptoms of the Nephritis, according to Boerhaave, are a great inflammatory, pungent, burning pain in the place where the kidneys are ſituated, attended with a fever. The urine is made often, but ſmall in quantity, and very red, or flame-coloured; yet, in the higheſt degree of the diſeaſe, watery. There is a numbneſs of the thigh, a pain in the groin, and the teſticle of the ſame ſide, a pain in the ilium, bilious vomiting, and continual eructations.

When the inflammation is deep, ſays Hoffman, the fever violent, the burning pain in the loins laſting, the difficulty of making water great, the body very coſtive, the anxiety and ſtraitneſs of the precordia exquiſite, the urine crude and white, and finally, when the pain continues to the fourteenth day, the kidney will ſuppurate, which is known from the abatement of the pain, and from the thick, purulent ſediment of the urine. This will ſometimes laſt ſeveral years, till there is nothing left of the kidney but a bag. This is attended with a hectic fever, and the patient before he dies is almoſt reduced to a ſkeleton. If the bag happens to burſt, it brings on a retention of urine, and intolerable pains, which end in death.

When the diſeaſe is favourable, it is cured, according to Boerhaave, by reſolution, or a copious red and thick urine diſcharged at one time; or, by a large flux of blood from the hæmorrhoidal veins, in the beginning of the diſeaſe. It is cured alſo by plentiful bleeding, revulſion, and dilution; and by ſoft emollient, antiphlogiſtic decoctions. Hoffman thinks emollient clyſters without any ſaline or purging ſtimulus, the principal help in this diſeaſe. They may be made of milk, whey, or ſoft water, in which elder and camomile-flowers have been boiled; to which add an ounce or two of ſyrup of marſh-mallows, and a dram of nitre. The body ſhould be kept open with oil of ſweet almonds; and wind in the bowels ſhould be diſcuſſed; for which purpoſe cumin ſeeds made into comfits are proper. When there are convulſions, or exceſſive pains, Boerhaave ſays, that opiates are proper; and that, if the vomiting, a ſymptom of this diſeaſe, is too frequent, warm water ſweetened with honey, is beneficial. The patient ſhould avoid all acrimonious aliment; he ſhould neither lie too hot, nor on his back. By this method likewiſe, a nephritis ariſing from a ſtone in the kidneys, or ureters, may be cured. When an abſceſs is formed, the medicines muſt be powerfully maturating and emollient.

When

When the urine appears purulent, they muſt be diuretics of medicated waters, whey, and the like, together with balſamics. In this caſe, Hoffman recommends emulſions of the four cold ſeeds, and ſweet almonds; ſome attribute a great virtue to cherry-tree gum diſſolved in whey and water, and taken often. A ſyrup of marſh-mallows is very uſeful; add to theſe the decoction of veronica, ſweetened with honey, mixt with powder of nutmegs.

Arbuthnot ſays, that butter-milk, not very ſour, has been reckoned a great ſecret in ulcers of the kidneys; and that chalybeat waters have been beneficial to ſome: he ſays, that ſpruce-beer is a good balſamic in this caſe, and adviſes ſoft malt liquors rather than wine. If the diſeaſe ends in a ſchirrous, there will be a palſey, or a lameneſs of the adjacent thigh, ſays Boerhaave, as alſo an incurable evil; whence will proceed a renal tabes. When there is a ſudden remiſſion of the pain, a cold ſweat, a weak intermitting pulſe, hiccoughing, a ſtoppage of urine; or when it is livid, black, full of hairs, fetid, abounding with brown or black caruncles, and a ſudden loſs of ſtrength, there is a mortal gangrene.

NEPOTISM, a term uſed in Italy, in ſpeaking of the authority which the popes nephews and relations have in the adminiſtration of affairs, and of the care the popes take to raiſe and enrich them. Many of the popes have endeavoured to reform the abuſes of nepotiſm, which at preſent is ſaid to be aboliſhed.

NERIUM, the oleander, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is cylindrical, the limb is large, and divided into five broad obtuſe ſegments, which are oblique; a ſhort nectarium terminates the top of the tube, which is torn into hairy ſegments; the ſtamina are five very ſhort ſubulated filaments, topped with arrow-ſhaped antheræ, and join together. The fruit is two long ſubulated pods, which are filled with oblong ſeeds placed in an imbricated order, and crowned with down. The common oleander is preſerved in our green-houſes in winter; it flowers in July and Auguſt, and makes an agreeable appearance. Another ſpecies, commonly called the double oleander, is very beautiful; but being tender, requires a hot-houſe to preſerve it; they are eaſily propagated by laying down their branches in the ſummer.

NERVES, *Nervi*, in anatomy, are cylindrical whitiſh parts, uſually fibroſe in their ſtructure; or compoſed of cluſters of filaments, ariſing from the brain, or rather from its medulla oblongata within the ſkull, and from the ſpinal marrow, and running from thence to every part of the body.

Structure and Uſe of the NERVES. This is eaſily perceived in moſt of the larger, and ſome of the ſmaller ones: for beſides the blood-veſſels they receive, and the membranes they are ſurrounded with, they are ſeen to be compoſed of a fibrous matter; or, as it were, of bundles or cluſters of white, cylindrical, and very ſlender filaments; which, on the ſtricteſt examination, appear to be ſolid, and without any cavity. Liewenhoeck indeed affirms, that he had often found a cavity in them; but he is not free from errors in many of his microſcopical obſervations. But though we cannot diſcover any cavity, much leſs a fluid in them; yet it is very poſſible that there may be ſuch cavities, and ſuch a fluid, only too ſmall to be perceived by us: and for the actual exiſtence of ſuch a fluid, known by the name of animal ſpirits, many probable arguments are adduced.

The great uſe of the nerves, therefore, though we are not able perfectly to demonſtrate it, ſeems to be to convey to all parts of the body a fluid of an extremely ſubtile kind, ſecreted in the brain and ſpinal marrow, and deſtined for no leſs noble a purpoſe than the ſenſation, motion, and nutrition of the ſeveral parts of the whole human fabric.

The ancients found, that by cutting, tying, or compreſſing any nerve, or any other way intercepting its communication with the brain, the parts to which it belonged were immediately deprived of all ſenſe and motion. One remarkable inſtance of this is, the making an animal dumb by tying the nerves near the wind pipe. We read in Galen, of a boy who became quite dumb by having both the recurrent nerves divided. The experiment of cutting theſe nerves in brute animals, was repeated and confirmed by Veſalius; and Dr. Martin aſſures us, he tried it ſucceſsfully on a pig; nor did the animal recover its voice, as ſome have ſuſpected it might. As the voice depends on a proper aperture of the glottis, it ſeems likely that, when the recurrent nerves are cut, the glottis will always ſtand open, and be incapacitated from being ſhut at the will of the animal. An anonymous phyſician offers what he calls an experimentum crucis, in proof of the nerves being compoſed of cylindrical canals, containing a fluid: it is the demonſtration of the optic nerve inflated and dried, which appears canular to the naked eye.

Wounds of the NERVES. Upon the diviſion of a nerve, Heiſter obſerves, that the limb to which that nerve was extended becomes inſtantly rigid, void of ſenſation, and withers: ſo that it is no wonder that a man inſtantly expires, upon the diviſion of thoſe nerves which are ſent to the heart or diaphragm: a wound is alſo attended with great danger where the nerve is partially wounded, and not entirely divided; for the wounded fibres contract themſelves, and thoſe which remain undivided ſuffer too great an extenſion, which will bring on moſt violent pains, ſpaſms, convulſions, inflammations, and gangrenes, and ſometimes death itſelf.

NESTORIANS, a Chriſtian ſect, the followers of Neſtorius, biſhop and patriarch of Conſtantinople;

ple; who, about the year 429, taught that there were two perſons in Jeſus Chriſt, the divine and the human, which are united, not hypoſtatically or ſubſtantially, but in a myſtical manner: whence he concluded, that Mary was the mother of Chriſt and not the mother of God. For this opinion, Neſtorius was condemned and depoſed by the council of Epheſus; and the decree of this council was confirmed by the emperor Theodoſius, who baniſhed the biſhop to a monaſtery.

Thoſe Chriſtians who at this day are called Neſtorians and Chaldeans, are very numerous, and are ſpread over Meſopotamia, and along the river Tigris and Euphrates: they are even got into the Indies, and into Tartary and China. Thoſe of India ſettled there under a Neſtorian prieſt called John, who, in the year 1145, got himſelf declared king of Indoſtan, and grew very famous under the name of Preſter John. The Neſtorians, though they ſpeak the language of the reſpective countries, only officiate in the Chaldee or Syriac tongue. The Neſtorian monks are habited in a black gown tied with a leathern girdle, and wear a blue turban. The nuns are dreſſed much after the ſame manner, excepting that they tie a kind of black veil about their heads and about their chins. They muſt be forty years old before they take the monaſtic habit.

NET, a device for catching fiſh and fowl.

The taking fowls by nets, is the readieſt and moſt advantageous of all others, where numbers are to be taken. The making the nets is very eaſy, and what every true ſportſman ought to be able to do for himſelf. All the neceſſary tools are wooden needles, of which there ſhould be ſeveral of different ſizes, ſome round and others flat: a pair of round-pointed and flat ſciſſars, and a wheel to wind off the thread. The packthread is to be of different ſtrength and thickneſs, according to the ſort of birds to be taken; and the general ſize of the meſhes, if not for very ſmall birds, is two inches from point to point. The nets ſhould neither be made too deep nor too long, for they are then difficult to manage; and they muſt be verged on each ſide with twiſted thread. The natural colour of the thread is too bright and pale, and is therefore in many caſes to be altered. The moſt uſual colour is the ruſſet, which is to be obtained by plunging the net after it is made, into a tanner's pit, and letting it lie there till it be ſufficiently tinged: this is of a double ſervice to the net, ſince it preſerves the thread as well as alters the colour. The green colour is given by chopping ſome green wheat and boiling it in water, and then ſoaking the net in this green tincture. The yellow colour is given in the ſame manner with the decoction of celandine, which gives a pale ſtraw-colour, which is the colour of ſtubble in the harveſt-time. The brown nets are to be uſed on ploughed lands, the green on graſs grounds, and the yellow on ſtubble lands.

NETTINGS, among ſeamen, a ſort of grating formed of cordage faſtened regularly together at equal diſtances, ſo as to reſemble a net; they are fixed on the quarter-rails, the intervals of which they fill up, being partly for ornament and partly for uſe; as to prevent any body on the deck from tumbling over-board, as the ſhips rocks from ſide to ſide. In a ſhip of war they have double rows of nettings, about eighteen inches diſtant from each other, theſe are ſupported by ſmall iron pillars, called ſtanchions, and the vacancy between is filled up with the hammocks and bedding of the ſailors, to ſerve as a fence in the time of action. The forecaſtle and the tops of large ſhips are alſo generally furniſhed with nettings.

NETTLE, *Urtica*, in botany, a genus of plants, producing male and female flowers; the male flowers, inſtead of petals, have a ſmall nectarium placed in the center, with four filaments topped with bilocular antheræ. The female flowers have no corolla; the germen is oval, and the ſtigma hairy: the ſeed is ſingle, oval, and obtuſely compreſſed, and placed in the cup. There are ſeveral kinds of nettles, as the common nettle, the leſſer ſtinging-nettle, the Roman nettle, &c. The juice of this plant is recommended to ſtop ſpitting of blood, and other hæmorrhages; the leaves are diuretic, and good in the gout, rheumatiſm, ſtone, and gravel; and are frequently uſed in the ſpring to cleanſe and purify the blood. The ſeeds and roots of nettles are ſaid to be a good remedy againſt the jaundice, and to promote expectoration in coughs, as well as in the aſthma and pleuriſy.

Dead NETTLE, *Lamium*, in botany. See the article LAMIUM.

NETTLE-TREE, *Celtis*, in botany. See the article CELTIS.

NEURADA, in botany, a genus of plants, the flower of which conſiſts of five equal petals, and its fruit is an orbiculated depreſſed capſule, convex on the under part, and every where armed with aſcending prickles: it contains ten cells, in each of which is a ſingle ſeed.

NEUTER, or NEUTER-GENDER, in grammar, one of the three genders of nouns, ſo called as being neither maſculine nor feminine. See the article GENDER.

NEUTER-VERBS. See the article VERB.

NEUTRAL-SALTS, among chemiſts, a ſort of ſalts neither acid nor alkaline, but partaking of the nature of both. See the articles ACID and ALKALI.

NEUTRALITY, the ſtate of a perſon or thing that is neuter, or that takes part with neither ſide.

NEW-MOON, *Neomenia*, ſtrictly ſpeaking, is the ſtate of the moon a little after her conjunction with the ſun; though it is often uſed for the conjunction itſelf. See MOON and NEOMENIA.

NEWEL,

NEWEL, in architecture, is the upright poſt which a pair of winding ſtairs turn about: this is properly a cylinder of ſtone which bears on the ground, and is formed by the end of the ſteps of the winding-ſtairs. There are alſo newels of wood, which are pieces of timber placed perpendicularly, receiving the tenants of the ſteps of the wooden ſtairs into their mortices, and on which are fitted the ſhafts and reſts of the ſtair caſe, and the flights of each ſtory.

NEWTONIAN PHILOSOPHY, the doctrine of the univerſe, and particularly of the heavenly bodies; their laws, affections, &c. as delivered by Sir Iſaac Newton.

The term Newtonian philoſophy is applied very differently by different authors. Some, under this philoſophy, include all the corpuſcular philoſophy, conſidered as it now ſtands corrected and reformed by the diſcoveries and improvements made in the ſeveral parts thereof by Sir Iſaac Newton. In this ſenſe it is that s'Graveſande calls his Elements of Phyſics, an Introduction to the Newtonian Philoſophy; and in this ſenſe, the Newtonian is the ſame with the new philoſophy, in oppoſition to the Carteſian, the peripatetic, and the antient corpuſcular philoſophy. See CARTESIAN, &c. Others, by Newtonian philoſophy, mean the method or order which Sir Iſaac obſerves in philoſophizing, viz. the reaſoning and drawing of concluſions directly from phænomena, excluſive of all previous hypotheſes; the beginning from ſimple principles, deducing the firſt powers and laws of nature from a few ſelect phænomena, and then applying thoſe laws, &c. to account for other things: and in this ſenſe, the Newtonian is the ſame with the experimental philoſophy.

Others again, by Newtonian philoſophy, mean that wherein phyſical bodies are conſidered mathematically, and where geometry and mechanics are applied to the ſolution of phænomena; in which ſenſe, the Newtonian is the ſame with the mechanical and mathematical philoſophy.

Others again, by Newtonian philoſophy, underſtand that part of phyſical knowledge which Sir Iſaac Newton has handled, improved, and demonſtrated in his Principia.

And, laſtly, others, by Newtonian philoſophy mean the new principles which Sir Iſaac has brought into philoſophy, the new ſyſtem founded thereon, and the new ſolutions of phænomena thence deduced; or that which characterizes and diſtinguiſhes his philoſophy from all others: and this is the ſenſe in which we ſhall chiefly conſider it.

As to the hiſtory of this philoſophy, we have but little to ſay: it was firſt made public in 1686, by the author, then a fellow of Trinity-college, Cambridge; and in the year 1713, republiſhed with conſiderable improvements. Several other authors have ſince attempted to make it plainer, by ſetting aſide many of the more ſublime mathematical reſearches, and ſubſtituting either more obvious reaſonings or experiments in lieu thereof; particularly Mr. Whiſton, in his Prelect. Phyſ. Mathem. s'Graveſande, in his Elem. and Inſt. and lately, by the learned Comment of Le Seur and Jacquier upon Sir Iſaac's Principia.

The philoſophy itſelf is laid down chiefly in the third book of the Principia; the two preceding books being taken up in preparing the way; and laying down ſuch principles of mathematics as have the moſt relation to philoſophy: ſuch are the laws and conditions of powers; and theſe, to render them leſs dry and geometrical, the author illuſtrates by ſcholia in philoſophy, relating chiefly to the denſity and reſiſtance of bodies, the motion of light and ſounds, a vacuum, &c.

In the third book he proceeds to the philoſophy itſelf; and from the ſame principles deduces the ſtructure of the univerſe, and the powers of gravity, whereby bodies tend towards the ſun and planets; and, from theſe powers, the motions of the planets and comets, the theory of the moon and the tides.

This book, which he calls De Mundi Syſtemate, he tells us, was firſt wrote in the popular way; but conſidering, that ſuch as are unacquainted with the ſaid principles, would not conceive the force of the conſequences, nor be induced to lay aſide their antient prejudices; for this reaſon, and to prevent the thing from being in continual diſpute, he digeſted the ſum of that book into propoſitions, in the mathematical manner, ſo as it might only come to be read by ſuch as had firſt conſidered the principles; not that it is neceſſary a man ſhould maſter them all; many of them, even the firſt rate mathematicians, would find a difficulty in getting over. It is enough to have read the definitions, laws of motion, and the three firſt ſections of the firſt book; after which, the author himſelf directs us to paſs on to the book De Syſtemate Mundi.

The great principle on which the whole philoſophy is founded, is the power of gravity: this principle is not new: Kepler, long ago, hinted it in his Introduct. ad Mot. Martis. He even diſcovered ſome of the properties thereof, and their effects in the motions of the primary planets; but the glory of bringing it to a phyſical demonſtration, was reſerved to the Engliſh philoſopher. See the article GRAVITATION.

His proof of this principle from phænomena, together with the application of the ſame principle to the various other appearances of nature, or the deducing thoſe appearances from that principle, conſtitute the Newtonian ſyſtem: which, drawn in miniature, will ſtand thus:

1. The phænomena are, 1. That the ſatellites of Jupiter do, by radii drawn to the center of the planet, deſcribe areas proportional to their times; and that their periodical times are in a ſeſquiplicate ratio of

of their diſtances from its center; in which the obſervations of all aſtronomers agree. 2. the ſame phænomenon holds of the ſatellites of Saturn, with regard to Saturn; and of the moon with regard to the earth. 3. The periodical times of the primary planets about the ſun, are in a ſeſquiplicate ratio of their mean diſtances from the ſun. But, 4. The primary planets do not deſcribe areas any way proportional to their periodical times, about the earth; as being ſometimes ſeen ſtationary, and ſometimes retrograde, with regard thereto.

2. The powers whereby the ſatellites of Jupiter are conſtantly drawn out of their rectilinear courſe, and retained in their orbits, reſpect the center of Jupiter, and are reciprocally as the ſquares of the diſtances from the ſame center. 2. The ſame holds of the ſatellites of Saturn, with regard to Saturn; of the moon, with regard to the earth; and of the primary planets, with regard to the ſun.

3. The moon gravitates towards the earth, and by the power of that gravity is retained in her orbit: and the ſame holds of the other ſatellites, with reſpect to their primary planets; and of the primaries, with reſpect to the ſun.

As to the moon, the propoſition is thus proved: the moon's mean diſtance is 60 ſemi-diameters of the earth; her period, with regard to the fixed ſtars, is 27 days, 7 hours, 43 minutes; and the earth's circumference 123249600 Paris feet. Now, ſuppoſing the moon to have loſt all her motion, and to be let drop to the earth, with the power which retains her in her orbit, in the ſpace of one minute ſhe will fall $15\frac{1}{12}$ Paris feet; the arch ſhe deſcribes in her mean motion, at the diſtance of 60 diameters of the earth, being the verſed ſine of $15\frac{1}{12}$ Paris feet. Hence, as the power, as it approaches the earth, increaſes in a duplicate ratio of the diſtance inverſely; ſo as at the ſurface of the earth it is 60×60 greater than at the moon; a body falling with that force in our region muſt, in a minute's time, deſcribe the ſpace of $60 \times 60 \times 15\frac{1}{12}$ Paris feet, and $15\frac{1}{12}$ Paris feet in the ſpace of one ſecond.

But this is the rate at which bodies fall by their gravity at the ſurface of our earth; as Huygens has demonſtrated by experiments with pendulums. Conſequently, the power whereby the moon is retained in her orbit, is the very ſame we call gravity; for, if they were different, a body, falling with both powers together, would deſcend with double the velocity, and in a ſecond of time deſcribe $30\frac{1}{6}$ feet.

As to the other ſecondary planets, their phænomena, with reſpect to their primary ones, being of the ſame kind with thoſe of the moon about the earth, it is argued by analogy, they depend on the ſame cauſes; it being a rule or axiom all philoſophers agree to, that effects of the ſame kind have the ſame cauſes.

Again, attraction is always mutual, i. e. the reaction is equal to the action: conſequently, the primary planets gravitate towards their ſecondary ones, the earth towards the moon, and the ſun towards them all. And this gravity, with regard to each ſeveral planet, is reciprocally as the ſquare of its diſtance from the center of gravity.

4. All bodies gravitate towards all the planets; and their weight towards any one planet; at equal diſtances from the center of the planet, is proportional to the quantity of matter in each.

For the law of the deſcent of heavy bodies towards the earth, ſetting aſide their unequal retardation from the reſiſtance of the air, is this, that all bodies fall equal ſpaces in equal times; but the nature of gravity or weight, no doubt, is the ſame on the other planets as on the earth.

Suppoſe, e. g. ſuch bodies raiſed to the ſurface of the moon, and together with the moon deprived at once of all progreſſive motion, and dropped towards the earth: it is ſhewn, that in equal times they will deſcribe equal ſpaces with the moon; and therefore, that quantity of matter is to that of the moon, as their weights to its weight.

Add, that ſince Jupiter's ſatellites revolve in times that are in a ſeſquiplicate ratio of their diſtances from the center of Jupiter, and conſequently at equal diſtances from Jupiter, their accelerating gravities are equal; therefore, falling equal altitudes in equal times, they will deſcribe equal ſpaces; juſt as in heavy bodies on our earth. And the ſame argument will hold of the primary planets with regard to the ſun, and the powers whereby unequal bodies are equally accelerated, are as the bodies, i. e. the weights are as the quantities of matter in the planets, and the weight of the primary and ſecondery planets towards the ſun, are as the quantities of matter in the planets and ſatellites. See the article JUPITER.

And hence are ſeveral corollaries drawn relating to the weights of bodies on the ſurface of the earth, magnetiſm, and the exiſtence of a vacuum.

5. Gravity extends itſelf towards all bodies, and is in proportion to the quantity of matter in each.

That all planets gravitate towards each other, has been already ſhewn; likewiſe, that the gravity towards any one, conſidered apart, is reciprocally as the ſquares of its diſtance from the center of the planet; conſequently, gravity is proportionable to the matter therein.

Farther, as all the parts of any planet A, gravitate towards another planet B; and the gravity of any part is to the gravity of the whole, as the matter of the part to the matter of the whole; and re-action equal to action: the planet B will gravitate towards all the parts of the planet A; and its gravity towards any part will be to its gravity towards the whole, as the matter of the part to the matter of the whole.

Hence we derive the methods of finding and comparing weights of bodies towards different planets;

of finding the quantity of matter in the ſeveral planets, and their denſities; ſince the weights of equal bodies, revolving about planets, are as the diameter of their orbits directly, and as the ſquares of the periodical times inverſely; and the weights at any diſtance from the center of the planet, are greater or leſs in a duplicate ratio of their diſtances inverſely. And ſince the quantities of matter in the planets are as their powers at equal diſtances from their centers: and laſtly, ſince the weights of equal and homogeneous bodies towards homogeneous ſpheres are, at the ſurfaces of the ſpheres, as the diameters of thoſe ſpheres; and conſequently, the denſities of heterogeneous bodies, are as the weights at the diameters of the ſpheres.

6. The common center of gravity of the ſun, and all the planets is at reſt; and the ſun, though always in motion, yet never recedes far from the common center of all the planets.

For the matter in the ſun being to that in Jupiter as 1033 to 1; and Jupiter's diſtance from the ſun to the ſemi-diameter of the ſun in a ratio ſomewhat bigger; the common center of gravity of Jupiter and the ſun will be a point a little without the ſun's ſurface; and by the ſame means, the common center of Saturn and the ſun will be a point a little within the ſun's ſurface; and the common center of the earth, and all the planets, will be ſcarce one diameter of the ſun diſtant from the center thereof: but the center is always at reſt; therefore, though the ſun will have a motion this and that way, according to the various ſituations of the planets, yet it can never recede far from the center; ſo that the common center of gravity of the earth, ſun, and planets, may be eſteemed the center of the whole world.

7. The planets move in ellipſes that have their foci in the center of the ſun, and deſcribe areas proportionable to their times. This we have already laid down à poſteriori, as a phænomenon; and now, that the principle of the heavenly motions is ſhewn, we deduce it therefrom à priori. Thus, ſince the weights of the planets towards the ſun are reciprocally, as the ſquares of their diſtances from the center of the ſun; if the ſun were at reſt, and the other planets did not act on each other, their orbits would be elliptical, having the ſun in the common umbilicus, and would deſcribe areas proportionable to the times; but the mutual actions of the planets are very ſmall, and may be well thrown aſide.

Indeed, the action of Jupiter on Saturn is of ſome conſequence; and hence, according to the different ſituation and diſtances of thoſe two planets, their orbits will be a little diſturbed. The earth's orbit too is ſenſibly diſturbed by the action of the moon; and the common center of the two deſcribes an ellipſis round the ſun placed in the umbilicus; and, with a radius drawn to the center of the ſun, deſcribes areas proportionable to the times.

8. The aphelia and nodes of the planets are at reſt, excepting for ſome inconſiderable irregularities ariſing from the action of the revolving planets and comets. Conſequently, as the fixed ſtars retain their poſition to the aphelia and nodes, they too are at reſt.

9. The axis, or polar diameter, of the planets, is leſs than the equatorial diameter.

The planets, had they no diurnal rotation, would be ſpheres, as having an equal gravity on every ſide: but by this rotation, the parts receding from the axis endeavour to riſe towards the equator, which, if the matter they conſiſt of be fluid, will be affected very ſenſibly. Accordingly, Jupiter, whoſe denſity is found not much to exceed that of water on our globe, is obſerved by aſtronomers to be conſiderably leſs between the two poles, than from eaſt to weſt. And, on the ſame principle, unleſs our earth were lighter at the equator than towards the poles, the ſea would riſe under the equator, and overflow all near it. But this figure of the earth Sir Iſaac Newton proves likewiſe à poſteriori, from the oſcillations of pendulums being ſlower and ſmaller in the equinoxial, than in the polar parts of the globe. See the article EARTH.

10. All the moon's motions, and all the inequalities of theſe motions, follow from theſe principles, e. g. her unequal velocity, and that of her nodes and apogee in the ſyzygies and quadratures; the differences in her eccentricity and her variation. See MOON.

11. From the inequalities of the lunar motions, we can deduce the ſeveral inequalities in the motions of the ſatellites.

12. From theſe principles, particularly the action of the ſun and moon upon the earth, it follows, that we muſt have tides, or that the ſea muſt ſwell and ſubſide twice every day.

13. Hence, likewiſe, follows the whole theory of comets, as that they are above the region of the moon, and in the planetary ſpaces; that they ſhine by the ſun's light, reflected from them; that they move in conic ſections, whoſe umbilici are in the center of the ſun; and, by radii drawn to the ſun, deſcribe areas proportional to the times; that the orbits, or trajectories, are very nearly parabolas; that their bodies are ſolid, compact, &c. like thoſe of the planets, and muſt therefore acquire an immenſe heat in their perihelia; that their tails are exhalations, ariſing from and encompaſing them like atmoſpheres.

NICHE, in architecture, a hollow ſunk into a wall, for the commodious and agreeable placing a ſtatue.

The ordinary proportion of a niche is to have two circles in height and one in width; but M. Le Clerc makes their height ſomething more, the exceſs being to compenſate for the height of the pedeſtal of the ſtatue. The hollow is ſemicircular at

bottom, that is, in its plan; and at top it terminates in a kind of canopy. Niches have frequently an impoſt, and an archivolt or head-band, and the canopy wrought and enriched in the manner of a ſhell. The breadth of the archivolt may be made equal to a ſixth or ſeventh part of the niche, and the height of the impoſt to a fifth or ſixth part of the ſame: and the impoſt and archivolt ought to conſiſt of ſuch mouldings as have ſome relation to the architecture of the place. Niches are ſometimes made with ruſtic-work, ſometimes with ſhell-work, and ſometimes of cradle or arbour-work. Niches are ſometimes made ſquare, but theſe want all the beauty of the others.

NICOLAITANS, in church hiſtory, Chriſtian heretics who aſſumed this name from Nicolas of Antioch; who, being a gentile by birth, firſt embraced Judaiſm, and then Chriſtianity; when his zeal and devotion recommended him to the church of Jeruſalem, by whom he was choſen one of the firſt deacons.

Many of the primitive writers believe, that Nicolas was rather the occaſion than the author of the infamous practices of thoſe who aſſumed his name, who were expreſsly condemned by the ſpirit of God himſelf, Apoc. ii. 6. And, indeed, their opinions and actions were highly extravagant and criminal. They allowed a community of wives; made no difference between ordinary meats and thoſe offered to idols; and told I know not what fables of the creation and diſpoſition of the world.

According to Euſebius, they ſubſiſted but a ſhort time; but Tertullian ſays, they only changed their name, and that their hereſies paſſed into the ſect of the Cainians. See CAINIANS.

NICOTIANA, tobacco, in botany. See the article TOBACCO.

NICTITATING MEMBRANE, in comparative anatomy, a thin membrane, chiefly found in the bird and fiſh-kind, which covers the eyes of theſe animals, ſheltering them from the duſt or too much light; yet is ſo thin and pellucid, that they can ſee pretty well through it.

NIDUS, among naturaliſts, ſignifies a neſt, or proper repoſitory for the eggs of birds, inſects, &c. wherein the young of theſe animals are hatched and nurſed.

NIECE, a brother or ſiſter's daughter; which in the civil law is reckoned the third degree of conſanguinity.

NIGELLA, fennel-flower, in botany, a genus of plants, whoſe flower conſiſts of five ovate, plain, obtuſe petals, contracted at their baſe, and eight very ſhort nectariums, placed in a circle and bilabiated: the filaments are numerous, ſubulated, and ſhorter than the petals; theſe are topped with upright, obtuſe, compreſſed antheræ: the germina are either five or ten, which become ſo many oblong, compreſſed, acuminated capſules, which are filled with rough angulated ſeeds.

NIGHT, that part of the natural day during which the ſun is underneath the horizon; or that ſpace wherein it is duſky. See DAY.

Night was originally divided by the Hebrews, and other eaſtern nations, into three parts, or watchings. The Romans, and afterwards the Jews from them, divided the night into four parts, or watches; the firſt of which began at ſun-ſet, and laſted till nine at night, according to our way of reckoning; the ſecond laſted till midnight; the third till three in the morning; and the fourth ended at ſun-riſe. The ancient Gauls and Germans divided their time not by days but by nights; and the people of Iceland and the Arabs do the ſame at this day. The like is alſo obſerved of our Saxon anceſtors.

NIGHT-MARE, in medicine, a diſeaſe called by phyſicians ephialtes and incubus. See the article INCUBUS.

NIGHT-WALKERS, *Noctambuli*. See the article NOCTAMBULI.

NIGHTINGALE, *Luſcinia*, in ornithology, the browniſh-grey motacilla, with the annules of the knees grey.

This bird is more eminent for the ſweetneſs of its note, than for its beauty: it is of the ſize of the linnet, but in ſhape it more reſembles the red-breaſt; the head is ſmall, the eyes are large, and their iris pale; the beak is duſky, ſlender, and moderately long; the head, neck, and back, are of a greyiſh-brown; the upper parts of the wings, and about the tail, have a tinge of reddiſh mixed with this; and the throat, breaſt, and belly, are of a pale whitiſh grey.

NIGHTSHADE, *Solanum*, in botany. See the article SOLANUM.

Deadly NIGHTSHADE. See ATROPA.

NIHILS, or NICHILS, iſſues which a ſheriff, who is oppoſed in the exchequer, ſays are nothing worth, and not to be levied, through the inſufficiency of the parties from whom the ſame are due.

NIMBUS, in antiquity, a circle obſerved on certain medals, or round the head of ſome emperors, anſwering to the circles of light, drawn around the images of ſaints.

The nimbus is ſeen on the medals of Maurice, Phocas, and others, even of the upper empire.

NIPPERS, in the manege, are four teeth in the fore-part of a horſe's mouth, two in the upper and two in the lower jaw. A horſe puts them forth between the ſecond and third year. See the article TOOTH.

NIPPERS, is alſo an inſtrument uſed among ſmiths and farriers; being a kind of pincers, wherewith, in ſhoeing a horſe, they cut the nails before they rivet them. It is alſo uſed in taking off a ſhoe.

NIP-

NIPPERS, in the marine, certain pieces of flat platted cordage, employed in heaving in the cable of a ſhip of war. See the articles MESSENGER and VOYAL.

When the cable is drawn into the ſhip by the force of the capſtern, there is always a rope of a ſmaller ſize, which is more convenient and pliable than the cable, wound about the capſtern; this rope is termed the voyal or meſſenger: it is faſtened in ſeveral places to the cable, by the nippers, as the cable comes in.

Theſe nippers are generally about ſeven, eight, or nine feet in length, in proportion to the ſize of the cable: they are clapped on the cable as ſoon as it enters the fore-part of the ſhip, and are taken off as ſoon as they reach about the middle of the deck, that the cable may be coiled away below, with all convenient diſpatch. There are generally five or ſix nippers on the cable at once; the boys of the ſhip walking along the deck with the ends of them in their hands, till they come to the place where it is neceſſary to take them off.

NIPPLES, *Papillæ*, in anatomy. See the article BREASTS.

NIPPLE-WORT, *Lapſana*, in botany. See the article LAPSANA.

NISI PRIUS, in law, a judicial writ which lies in caſes where the jury being impannelled and returned before the juſtices of the bank, one of the parties requeſts to have ſuch a writ, for the eaſe of the country, in order that the trial may come before the juſtices in the ſame county on their coming thither. Theſe trials by niſi prius are intended for the eaſe of the country, by ſaving the parties, jurors, and witneſſes, the trouble of coming to Weſtminſter. The purport of a writ of niſi prius is, that the ſheriff is thereby commanded to bring to Weſtminſter the men impannelled, at a certain day before the juſtices, "Niſi prius juſticiarii domini regis ad "aſſiſas capiendas venerint;" that is, unleſs the juſtices go before the day into ſuch a county to take aſſizes.

NISSOLA, in botany, a genus of plants, whoſe flower is papilionaceous, the vexillum is roundiſh and reflexed, the alæ are oblong, obtuſe, and erect, which ſhut up the carina. The fruit is an oblong, cylindric capſule, containing often but one oblong ſeed.

NITRARIA, in botany, a genus of plants, whoſe flower conſiſts of five oblong patent petals, with fifteen ſubulated filaments, topped with roundiſh antheræ. The fruit is an ovato-oblong acuminated drupe, with one cell, containing one trilocular oval ſeed.

NITRE, or ſalt-petre, is a ſimple ſalt, which is pellucid, but ſometimes whitiſh, and in its moſt perfect pieces is in the form of long and ſlender cryſtals, of a priſmatic figure, of an equal thickneſs throughout their whole length, compoſed of ſix planes or ſides, and terminated at the end by a pyramid, which is ſmall and ſhort in proportion to the ſize of the column, but compoſed of the ſame number of planes. Theſe ſprigs vaſtly reſemble the common ſprig cryſtals of the rocks. Nitre is to be choſen in fair, long, and tranſparent cryſtals, and ſuch as when applied to the tongue, affects it with a peculiar kind of coldneſs; ſuch as when ſet on the fire eaſily melts, and on being thrown upon it, blazes very furiouſly, and emits a bright and vivid flame without crackling, and leaves only a very little fixed ſalt on the coals.

Nitre is found immerſed in imperceptible particles in earthy ſubſtances, as the particles of metals in their ores; but ſometimes it is found native and pure, in the form of an efflorescence or ſhapeleſs ſalt, either on its ore or on old walls. The earth from which nitre is made, both in Perſia and the Eaſt-Indies, is a kind of marl, found on the bare cliffs on the ſides of hills expoſed to the northern or eaſtern winds, and never in any other ſituation. The people of thoſe countries collect large quantities of this, and having a large and deep pit, which they line with a hard and tenacious kind of clay, they fill it half full of water, and into this they throw the earth; when this is broken and mouldered to powder, they add more water, and ſtirring all well together, they let it ſtand four or five days; after this they open a hole made in one of the ſides of the pit, which lets out all the clear water into a channel of about a foot wide, which is in the ſame manner clayed within, through which it runs into another very wide and ſhallow pit, which is prepared in a level ground, and is ſecured by ſlight walls on all but the north-eaſt ſide, and is open to the ſun at the top; here the water by degrees evaporates, and the ſalt which it had imbibed from the earth, cryſtallizes into ſmall, browniſh-white hexaedral, but uſually imperfect cryſtals, which are preſerved; and this is the rough ſaltpetre we receive from the Eaſt-Indies. The far greater part of the nitre uſed in the world is prepared in this manner; though there are many other methods of procuring it. In ſeveral of the eaſtern nations, the ruins of old buildings expoſed to the north and eaſt winds, and ſheltered from rain, have their walls covered with an efflorescence of a nitrous ſalt, which they throw into the ſolution of the ſalt from the ore, when it will no longer afford any cryſtals of itſelf, and by this addition it becomes capable of affording a large quantity of additional cryſtals like the firſt. Earths moiſtened or manured with the excrements of animals, as the earths of pigeon-houſes, and the like, all afford more or leſs nitre; and vaſt quantities of this ſalt are annually made in France, by boiling in water the matter of old walls, the old plaiſter of ruined buildings, and the earths of ſtables and other places where animals have been fed.

Saltpetre is of very great uſe in the manufactures; beſides

beſides being the baſis of gun-powder, it is uſed in the making of white glaſs, and is of the ſame uſe as common ſalt in preſerving of foods.

Purified nitre is one of the capital remedies in medicine. It cools and thins the blood, and gives it a fine florid colour; and therefore in all inflammatory diſeaſes attended with condenſations of the blood, this ſalt proves excellently cooling and attenuating. It is greatly ſerviceable in pleuriſies, peripneumonies and quinſies, in the ſuppreſſion of urine, and in the ſmall-pox.

NOBILITY, a quality that ennobles, and raiſes a perſon poſſeſſed of it above the rank of a commoner.

The origin of nobility in Europe is by ſome referred to the Goths; who, after they had ſeized a part of Europe, rewarded their captains with titles of honour, to diſtinguiſh them from the common people. In Britain the term nobility is reſtrained to degrees of dignity above knighthood; but every where elſe nobility and gentility are the ſame.

NOBLE, a money of account containing ſix ſhillings and eight-pence.

The noble was anciently a real coin, ſtruck in the reign of Edward III. and then called the penny of gold; but it was afterwards called a roſe-noble, from its being ſtamped with a roſe.

NOCTILUCA, in phyſiology, a ſpecies of phoſphorus, ſo called becauſe it ſhines in the night without any light being thrown upon it; ſuch is the phoſphorus made of urine. See the article PHOSPHORUS.

NOCTURNAL, ſomething relating to the night, in contradiſtinction to diurnal.

NOCTURNAL-ARCH, in aſtronomy, the arch of a circle deſcribed by the ſun, or a ſtar, in the night.

Semi-NOCTURNAL *arch of the Sun*, is that portion of a circle he paſſes over between the lower part of our meridian and the point of the horizon, wherein he ariſes; or between the point of the horizon wherein he ſets, and the lower part of our meridian.

NOCTURNAL, *Nocturlabium*, an inſtrument formerly much uſed at ſea, to take the altitude or depreſſion of ſome ſtars about the pole, in order to find the latitude and hour of the night.

NODATED HYPERBOLA, a name given by Sir Iſaac Newton, to a kind of hyperbola, which, by turning round, decuſſates or croſſes itſelf.

NODE, *Nodus*, in ſurgery, a tumour ariſing on the bones, and uſually proceeding from ſome venereal cauſe; being much the ſame with what is otherwiſe called exoſtoſis.

NODES, in aſtronomy, the two points wherein the orbit of a plane interſects the ecliptic.

NODULE, or NODULUS, a word uſed in pharmacy, for a knot tied in a rag, and including ſome medicinal ingredients to be ſuſpended in any liquor, as beer, or wine, to give it a tincture, or the like.

It ſignifies alſo a parcel of odoriferous ſimples, tied up in a piece of ſilk, for the patient to be frequently ſmelling to.

NODUS, or NODE, in dialling, a certain point or pole in the gnomon of a dial, by the ſhadow or light whereof, either the hour of the day in dials without furniture, or the parallels of the ſun's declination, and his place in the ecliptic, &c. in dials with furniture, are ſhewn.

NODUS is alſo uſed for the hole in a ceiling of a room, or in the window, for making of a dial on the floor, wall, or the like.

NOERA, a word uſed by chemiſts, for the head of an alembec, or the cover of a cucurbite, or any other veſſel uſed in diſtillation.

NOETIANS, in church-hiſtory, Chriſtian heretics in the IIId century, followers of Noetius, a philoſopher of Epheſus, who pretended that he was another Moſes, ſent by God; and that his brother was a new Aaron. His hereſy conſiſted in affirming that there was but one perſon in the Godhead; and that the Word and the Holy Spirit were but external denominations, given to God, in conſequence of different operations; that as creator, he is called Father; as incarnate, Son; and as deſcending on the apoſtles, Holy Ghoſt.

NOLANA, in botany, a genus of plants, whoſe flower is monopetalous, campanulated, plicated, and ſpreading open: it hath five ſubulated filaments, topped with arrow-ſhaped antheræ. The ſeeds are five in number, of a rouniſh figure, and placed on a receptacle.

NOLI ME TANGERE, *touch me not*, in medicine, a malignant eruption in the face, occaſioned by an extremely ſharp corroſive humour; thus called, either becauſe it affects thoſe who touch it, or becauſe the more it is touched, the worſe it grows, and the farther it ſpreads.

NOMBRIL POINT, in heraldry, is the next below the feſs-point, or the very center of the eſcutcheon. See POINT.

Suppoſing the eſcutcheon divided into two equal parts below the feſs, the firſt of theſe diviſions is the nombril, and the lower the baſe.

NOME, or NAME, in algebra, denotes any quantity with a ſign prefixed or added to it, whereby it is connected with ſome other quantity, upon which the whole becomes a binominal, trinominal, or the like.

NOMINALS, or NOMINALISTS, a ſect of ſchool-philoſophers, the diſciples and followers of Occam, or Ocham, an Engliſh cordelier, in the fourteenth century. They were great dealers in words, whence they were denominated word-ſellers; but had the denomination of nominaliſts, becauſe that, in oppoſition to the realiſts, they maintained, that words, and not things, were the object of dialectics.

NO-

NOMINATIVE, in grammar, the firſt caſe of nouns, which are declinable. See the articles CASE and NOUN.

NONAGESIMAL, in aſtronomy, the 90th degree of the ecliptic, reckoned from the eaſtern term or point. See the article ECLIPTIC, &c.

NON-ABILITY, in law, incapacity, or an exception taken againſt a plaintiff, in a cauſe, on ſome juſt ground, why he cannot commence a ſuit in law; as his being attainted of felony, outlawry, &c.

NON-AGE, in law, generally ſignifies all the time a perſon continues under the age of one and twenty; but in a ſpecial ſenſe it is all the time a perſon is under the age of fourteen.

NON COMPOS MENTIS, in law, is uſed to denote a perſon's not being of ſound memory and underſtanding. Of theſe perſons there are four different kinds, an idiot, a madman, a lunatic who has lucid intervals, and a drunkard who deprives himſelf of reaſon by his own act and deed. In all theſe caſes, except the laſt, one that is non compos mentis ſhall not loſe his life for felony or murder; but the drunkard can have no indulgence on account of the loſs of his reaſon, for, in the eye of the law, his drunkenneſs does not extenuate, but aggravate his offence.

NON-NATURALS, in medicine, ſo called, becauſe by their abuſe they become the cauſe of diſeaſe. See DISEASE.

Phyſicians have divided the non-naturals into ſix claſſes, viz. the air, meats and drinks, ſleep and watching, motion and reſt, the paſſions of the mind, the retentions and excretions.

NON-RESIDENCE is particularly applied to ſpiritual perſons, who wilfully abſent themſelves for the ſpace of one month, or two months at different times of the year, from their benefices; for which they are liable to penalties, by the ſtatute of non-reſidence: but biſhops, the king's chaplains, &c. are excepted.

NON-SUIT, ſignifies the dropping of a ſuit or action, or a renouncing thereof by the plaintiff or defendant, which happens moſt commonly upon the diſcovery of ſome error in the plaintiff's proceedings, when the cauſe is ſo far proceeded in, that the jury is ready at the bar to deliver in their virdict.

A non-ſuit, it is ſaid, may be in the following caſes, viz. where a perſon brings a perſonal action, and does not proſecute it with effect; or if, upon the trial, he refuſes to ſtand a verdict, then he becomes non-ſuited; ſo where the plaintiff is not ready for trial at the calling and ſwearing of the jury, it is preſumed he does not ſtand to proceed in his cauſe, and on that account the court may call him non-ſuited. Likewiſe, on a trial, when the jury comes in to deliver their verdict, and when the plaintiff is called on, to hear the ſame, in that caſe, if he does not appear after being thrice called by the crier of the court, he is non-ſuited; which non-ſuit is to be recorded by the ſecondary, by the direction of the court: but if he afterwards appears, before the non-ſuit is actually recorded, the court may take the verdict; for that is not a non-ſuit, till it be recorded, upon motion made by the counſel for this purpoſe; and then it is a part of the record, in the nature of a judgment againſt the plaintiff.

NONCONFORMISTS, the ſame with diſſenters. See the article DISSENTERS.

NONE, one of the ſeven canonical hours in the Romiſh church, anſwering to three o'clock in the afternoon.

NONES, *Nonæ*, in the Roman calendar, the fifth day of the months January, February, April, June, Auguſt, September, November, and December; and the ſeventh of March, May, July, and October.

March, May, July, and October, had ſix days in their nones; becauſe theſe alone, in the ancient conſtitution of the year by Numa, had thirty-one days apiece, the reſt having only twenty-nine, and February thirty: but when Cæſar reformed the year, and made other months contain thirty-one days, he did not allot them ſix days of nones.

NORMAL, in geometry, ſignifies the ſame with a perpendicular, and is uſed for a line or plane that interſects another perpendicularly.

NORROY, the title of the third of the three kings at arms. See HERALD.

NORTH, in coſmography, one of the four cardinal points. See COMPASS.

NORTHING, in navigation, the latitude made by a ſhip, in ſailing towards the north-pole.

NOSE, *Naſus*, in anatomy, the primary organ of ſmelling.

This varies greatly in ſize and figure in different ſubjects: anatomiſts divide its parts into external and internal; thoſe moſt obvious are the dorſum or ridge, which runs along its whole length, one part of which is more prominent than the reſt, and called the ſpine; the orbiculus, or extreme part, which in many is turned round; the alæ or pinnæ, which are the ſides; and the ſeptum, which divides the noſe into two parts, called nares or noſtrils; the hairs alſo are of this number; theſe ſerve to hinder the mucous of the noſtrils from continually running out, and to prevent inſects and extraneous ſubſtances of many kinds from getting in. To theſe may be added, the common teguments, viz. the epidermis, the fat, and the cutis. The upper part of the noſe is rigid, and compoſed of bones; the lower part is compoſed of a number of cartilages, muſcles, and membranes.

The internal parts of the noſe are the bones; as the oſſa naſi, the maxillaria, the os cribriforme, the oſſa ſpongioſa, the os frontale, the lachrymalia, the os palati, the vomer, and the os ſphenoides. The

cartilages, which form the lower part, are connected by membranes, in order to render it flexible; the firſt of theſe form the anterior part of the ſeptum narium; there are two very large and conſpicuous ones in each of the alæ, and between theſe there are placed ſometimes two, ſometimes three, and ſometimes more ſmaller ones; the ſeptum narium is cartilaginous in its anterior and lower part; in its poſterior and upper, it is bony: and theſe parts are ſurrounded by robuſt and ſtrong membranes, which join them firmly together.

NOSTRILS, *Nares*, in anatomy, the two apertures or cavities of the noſe, through which the air paſſes, and which ſerve to convey odours, and to carry off the pituita ſeparated in the ſinuſes of the baſe of the cranium. See NOSE.

NOTARY, *Notarius*, ſignifies a perſon, uſually ſome ſcrivener, who takes notes, or frames ſhort draughts, of contracts, obligations, charter-parties, or other writings. At preſent we call him a notary-public, who publicly atteſts deeds, or writings, in order to make them authentic in another nation: but he is principally employed in buſineſs concerning merchants, as making proteſts of bills of exchange, &c. And noting a bill, is where he goes to take notice of a merchant's refuſal to accept or pay the ſame.

NOTATION, in arithmetic and algebra, the method of expreſſing numbers or quantities by ſigns or characters, appropriated for that purpoſe.

NOTE, *nota*, is uſed for a character or abbreviature, ſerving to denote or expreſs ſomething in a little compaſs.

NOTES, in muſic, characters which mark the ſounds, i. e. the elevations and fallings of the voice, and the ſwiftneſs and ſlowneſs of its motions. See CHARACTER.

NOTE is likewiſe uſed for a mark made in a book or writing where there occurs ſomething remarkable and worthy of particular notice: as alſo for an obſervation or explication of ſome paſſage in an author added in the margin, at the bottom of the page, or elſewhere, by an editor, in which ſenſe it ſtands contradiſtinguiſhed to text.

NOTE is alſo a minute, or ſhort writing, concerning ſome article of buſineſs, in which ſenſe we ſay, promiſſary note, note of hand, bank note, &c.

To NOTE *a Bill.* See the article BILL.

NOTE *of a Fine*, in law, an abſtract of the fine or contract made by the chirographer, before the ſame is engroſſed.

NOTICE, in law, is defined to be the making of ſomething known, which a man might be ignorant of before: and it has divers effects in our law; for thereby a party giving the ſame, may reap a benefit which he otherwiſe ſhould not have had; and by this means the perſon to whom it is given, is liable to ſome charge or action to which without it he had not been ſubject.

NOTION, in logic, an idea or repreſentation of any thing in the mind. See the article IDEA.

NOVATIONS, a Chriſtian ſect which ſprang up in the third century, ſo called from Novatian, a prieſt of Rome, or Novatus, an African biſhop, who ſeparated from the communion of pope Cornelius, whom Novatian charged with a criminal lenity towards thoſe who had apoſtatized during the perſecution of Decius. He denied the church's power of remitting mortal ſins, upon the offender's repentance; and at laſt went ſo far as to deny that the apoſtles could ever hope for pardon even from God himſelf. Novatus coming to Rome, joined with the followers of Novation, and added to theſe doctrines another, which was the unlawfulneſs of ſecond marriages, againſt which this became as ſevere as againſt apoſtates; denying communion to ſuch as married a ſecond time after baptiſm, and treating widows who married again, as adultereſſes. The two leaders were proſcribed and declared heretics, not for excluding penitents from communion, but for denying that the church had the power of remitting ſins.

NOVEL, in the civil law, a term uſed for the conſtitutions of ſeveral emperors, as of Juſtin, Tiberius, Leo, and more particularly of thoſe of Juſtinian.

NOVEL, in matters of literature, a fictitious hiſtory of a ſeries of ſurprizing and entertaining events in common life, wherein the rules of probability are, or ought to be, ſtrictly preſerved; in which it differs from a romance, where the hero and heroine is ſome prince and princeſs, and the events which lead to the cataſtrophe, are in general highly abſurd and unnatural. The beſt novels are thoſe which by means of a well told ſtory, convey a number of noble and elevated ſentiments, and inſtruct the reader in the knowledge of mankind.

NOVEMBER, in chronology, the eleventh month of the Julian year, conſiſting only of thirty days: it got the name of November, as being the ninth month of Romulus's year, which began with March.

NOVEMSILES, or NOVENSILES DII, in Roman antiquity, certain gods brought to Rome by the Sabines, and ſo called as being nine in number, viz. Lara, Veſta, Minerva, Feronia, Concord, Fidelity, Fortune, Chance, Health.

Some underſtand, by novenſiles dii, new created gods, or thoſe whoſe worſhip was brought from ſome foreign country to Rome; whilſt others pretend, they ſignified the nine muſes.

NOUN, *Nomen*, in grammar, a part of ſpeech, which ſignifies things without any relation to time; as a man, a houſe, ſweet, bitter, &c.

NOURISHMENT, or NUTRITION, in phyſiology. See NUTRITION.

NOWED, in heraldry, ſignifies knotted, from the Latin *nodatus*; being applied to the tails of ſuch

creatures as are very long, and ſometime repreſented in coat armour, as if tied up in a knot.

NUCLEUS, in general, denotes the kernel of a nut, or even any ſeed incloſed within a huſk.

The term nucleus is alſo uſed for the body of a comet, otherwiſe called its head. See the article COMET.

NUDITES, in painting and ſculpture, denotes thoſe parts of an human figure which are not covered with any drapery; or thoſe parts where the carnation appears.

NUMBER, *Numerus*, in arithmetic, an aſſemblage of ſeveral units, or things of the ſame kind.

NUMBERS, in poetry, oratory, muſic, &c. are certain meaſures, proportions, or cadences, which render a verſe, period, or ſong, agreeable to the ear. See METRE.

Book of NUMBERS, the fourth book of the Pentateuch, taking its denomination from it numbering the families of Iſreal.

A great part of this book is hiſtorical, relating to ſeveral remarkable paſſages in the Iſraelites march through the wilderneſs. It contains a diſtinct relation of their ſeveral movements from one place to another, or the two and forty ſtages through the wilderneſs, and many other things, whereby we are inſtructed and confirmed in ſome of the weightieſt truths that have immediate reference to God and his providence in the world. But the greateſt part of this book is ſpent in enumerating theſe laws and ordinances, whether civil or ceremonial, which were given by God, but not mentioned before in the preceding books.

NUMB-FISH, the ſame with the torpedo or cramp-fiſh. See the article TORPEDO.

MUMERAL LETTERS, thoſe letters of the alphabet which are generally uſed for figures, as I, V, X, L, C, D, M. See the article NUMERATION.

NUMERAL CHARACTERS. See the article CHARACTER.

NUMERALS, in grammar, thoſe words which expreſs numbers; as 6, 8, 10, &c.

NUMERATION, or NOTATION, in arithmetic, the art of expreſſing in characters any number propoſed in words; or of expreſſing in words any number propoſed in characters.

The characters uſed to expreſs numbers by, are either the ten numeral figures of the Arabians, viz.

one, two, three, four, five, ſix, ſeven, eight, nine, cypher;
1 2 3 4 5 6 7 8 9 0

Or the ſeven numeral letters of the Romans,

one,	five,	ten,	fifty,	hundred,	five-hundred,	thouſand.
I	V	X	L	C	D	M

Each of which figures, beſides their own ſingle value, receives ſeveral denominations according to their place and order. A number has ſo many places as there are figures in it, as 36487 is the number of five places. The order in whoſe number is from the right to the left. The value of places decreaſe in a decuple proportion: for every place to the left is ten times the value of the next place to the right. Each place alſo has its name; and thoſe names, for the more eaſy reading of large numbers, are diſtinguiſhed by periods, half-periods, &c.

For as a place, So a half-period, And a period } is { ten, a thouſand, a million } times the value of that before it.

A cypher is of itſelf inſignificant; but by its place alters the value of the ſubſequent figure: and, ſince the value of each place is ten times the value of the next before it, it is certain

that { 1, 2, 3, &c. } in the firſt place, is { 10, 20, 30, &c. } in the ſecond, { 100, 200, 300, &c. } in the third, { 1000, 2000, 3000, &c. } in the fourth, &c.

The value of each figure in any rank of numbers, how large ſoever, is readily found by the following rule:

Begin at units, ſet a point under the ſeventh place; then reckoning that as one, count forwards, and ſet another under the next ſeventh place, ſo continue to the end.

then

Then the { first, second, third, fourth, &c. } point from units ſtands under { millions, billions, trillions, quadrillions, &c.

As is evident in the following example:

Periods	Quadril.		Trillions		Billions		Millions		Units	
Half-periods	th.	units	th.	units	th.	units	th.	units	th.	units
Degrees	c x u	c x u	c x u	c x u	c x u	c x u	c x u	c x u	c x u	c x u
Figures	1 2 3	4 5 6	7 8 9	0 9 8	7 6 5	4 3 2	1 0 1	2 3 4	5 6 7	8 9 1

By this means you may have as clear a notion of, and may as eaſily read a number of ſeventy places as of ſeven.

NUMERATOR *of a Fraction.* See the article FRACTION.

NUN, a woman, in ſeveral Chriſtian countries, who devotes herſelf, in a cloiſter or nunnery, to a religious life.

NUNCIO, or NUNTIO, an embaſſador from the pope to ſome catholic prince or ſtate, or a perſon who attends on the pope's behalf at a congreſs, or an aſſembly of ſeveral embaſſadors.

NUNCUPATIVE, in the ſchools, ſomething that is only nominal, or has no exiſtence but in name.

NUNCUPATIVE WILL, denotes a laſt will or teſtament, only made verbally, and not put in writing. See the articles WILL and TESTAMENT.

NUPTIAL RITES, the ceremonies attending the ſolemnization of marriage. See the article MARRIAGE.

NURSERY, in gardening, is a piece of land ſet apart for raiſing and propagating all ſorts of trees and plants, to ſupply the garden and other plantations.

In a nurſery for fruit-trees, the following rules are to be obſerved: 1. That the ſoil ſhould not be better than that in which the trees are to be planted out for good. 2. That it ought to be freſh, and not ſuch as has been already worn out by trees, or other large-growing plants. 3. It ought neither to be too wet nor too dry, but rather of a middling nature; though, of the two extremes, dry is to be preferred; becauſe, though trees in ſuch a ſoil do not make ſo great a progreſs yet they are generally ſounder, and more diſpoſed to fruitfulneſs. 4. It muſt be incloſed in ſuch a manner, that neither cattle nor vermin may come in; and ſo as particularly to exclude hares and rabbits, which, when the ground is covered with ſnow, are great deſtroyers of young trees. 5. The ground being incloſed ſhould be carefully trenched about two feet deep; this ſhould be done in Auguſt, that it may be ready for receiving young ſtocks at the ſeaſon for planting, which is commonly about the beginning of October: in trenching the ground, you muſt be careful to cleanſe it from the roots of all noxious weeds. 6. The ſeaſon being come for planting, level down the trenches as equal as poſſible; and then lay out the ground into quarters, which may be laid out in beds for a ſeminary, in which you may ſow the ſeeds or ſtones of fruit. 7. And having provided yourſelf with ſtocks, the next year proceed to tranſplant them, in the following manner: draw a line acroſs the ground intended to be planted, and open a number of trenches exactly ſtraight; then take the ſtocks out of the ſeed-beds; in doing which, you ſhould raiſe the ground with a ſpade, in order to preſerve the roots as entire as poſſible; prune off the very ſmall fibres, and if there are any that have a tendency to root directly downwards, ſuch roots ſhould be ſhortened: then plant them in the trenches, if they are deſigned for ſtandards, in rows three feet and a half, or four feet, from each other, and a foot and a half diſtant in the rows; but if for dwarfs, three feet, row from row, and one foot in the row, will be a ſufficient diſtance. Theſe plants ſhould by no means be headed, or pruned at top, which will weaken them, and cauſe them to produce lateral branches.

If the winter ſhould prove very cold, lay ſome mulch on the ſurface of the ground near their roots, taking care not to let it lie too thick near the ſtems of the plants, and to remove it as ſoon as the froſt is over. In the ſummer ſeaſon, deſtroy the weeds, and dig up the ground every ſpring between the rows.

The ſecond year after planting, ſuch of the ſtocks as are deſigned for dwarfs will be fit to bud; but thoſe that are deſigned for ſtandards ſhould be ſuffered to grow five or ſix feet high before they are budded or grafted; for the manner of doing which, ſee the articles INOCULATION and GRAFTING.

As to timber-trees, Mr. Miller adviſes thoſe gentlemen who would have plantations in parks, woods, &c. to make nurſeries upon the ground intended for planting, where a ſufficient number of the

the trees may be left ſtanding, after the others have been drawn out to plant in other places.

The ground intended for the flower nurſery ſhould be well ſituated to the ſun; and defended from ſtrong winds by plantations of trees or buildings. The ſoil alſo ſhould be light and dry, eſpecially for bulbous-rooted flowers; for in this nurſery, the off-ſets of all bulbous-rooted flowers ſhould be planted, and remain there till they become blowing roots, when they ſhould be removed into the pleaſure-garden, and planted either in beds or borders, according to the goodneſs of the flowers. Theſe flowers may alſo be raiſed in the nurſery from ſeeds.

The ſeedling auriculas, polyanthoſes, ranunculuſes, anemonies, carnations, &c. ſhould be raiſed in this nurſery, where they ſhould be preſerved till they have flowered, when all thoſe ſhould be marked that are worthy of being tranſplanted into the flower-garden; this ſhould be done in their proper ſeaſons: for all theſe ſeedling flowers ought not indiſcriminately to be expoſed to public view in the pleaſure-garden, becauſe it always happens, that there are great numbers of ordinary flowers produced among them, which will there make but an indifferent appearance.

NUSANCE, in law, a thing done to the annoyance of another.

NUT, *Nux*, among botaniſts, denotes a pericarpium of an extraordinary hardneſs, incloſing a kernel or ſeed; of which there are ſeveral kinds, as filberts, walnuts, &c. See the articles FILBERT, WALNUT, &c.

The word nut makes part of the Engliſh names of ſeveral plants; as the bladder-nut, or ſtaphylæa; the chocolate-nut, or theobroma; the cob-nut, or corylus; the earth-nut, or bunium; the phyſic-nut, or croton, &c. See the articles STAPHYLÆA, &c.

NUTATION, in aſtronomy, a kind of tremulous motion of the axis of the earth, whereby, in each annual revolution, it is twice inclined to the ecliptic, and as often returns to its former poſition. See the articles EARTH and INCLINATION.

Sir Iſaac Newton obſerves, that the moon has the like motion, only very ſmall, and ſcarce ſenſible.

NUTMEG, the kernel of a large fruit of a tree, which grows naturally in the Eaſt-Indian iſlands: it is called by botaniſts Myriſtica; but the deſcription of the flower, and the claſs it belongs to, is not yet properly aſcertained, the plants which produce this fruit being entirely in the poſſeſſion of the Dutch, which they carefully keep to themſelves.

The nutmeg is ſeparated from its inveſtient coat, the mace, before it is ſent over to us; except that the whole fruit is ſometimes imported in preſerve, by way of ſweetmeat, or as a curioſity. See the article MACE.

There are two kinds of nutmeg in the ſhops, the one called by authors the male, and the other the female. The female is the kind in common uſe, and is of the ſhape of an olive: the male is long and cylindric, and has leſs of the fine aromatic flavour than the other, ſo that it is much leſs eſteemed, and people who trade largely in nutmegs will ſeldom buy it. Beſides this oblong kind of nutmegs, there are others of irregular figures, but mere luſus naturæ, not owing to a different ſpecies of the tree. The longer male nutmeg, as we term it, is called by the Dutch the wild nutmeg. It is always diſtinguiſhable from the others, as well by its want of fragrancy, as by its ſhape: it is very ſubject to be worm-eaten, and is ſtrictly forbid by the Dutch to be packed up among the other, becauſe it will give occaſion to their being worm-eaten too, by the inſects getting from it into them, and breeding in all parts of the parcel.

The largeſt, heavieſt, and moſt unctuous of the nutmegs are to be choſen, ſuch as are of the ſhape of an olive, and of the moſt fragrant ſmell. The Dutch import them from the Eaſt-Indies.

Nutmeg is greatly uſed in our foods, and is of excellent virtues as a medicine; it is a good ſtomachic, it promotes digeſtion, and ſtrengthens the ſtomach. It alſo ſtops vomiting; is an excellent remedy in flatuſes; and is happily joined with rhubarb, and other medicines, in diarrhœas. It is obſerved to have a ſoporific virtue, and to exert it too ſtrongly, if taken in immoderate quantities. It has a conſiderable degree of aſtringency; and given after toaſting before the fire, till thoroughly dry and crumbly, it has been ſometimes known alone to cure diarrhœas.

NUTRITION, in the animal œconomy, is the repairing the continual loſs, which the different parts of the body undergo.

The motion of the parts of the body, the friction of theſe parts with each other, and eſpecially the action of the air, would deſtroy the body entirely, if the loſs was not repaired by a proper diet, containing nutritive juices; which being digeſted in the ſtomach, and afterwards converted into chyle, mix with the blood, and are diſtributed through the whole body for its nutrition.

NUX MOSCHATA. See NUTMEG.

NUX PISTACHIA. See PISTACHIA.

NYCHTHEMERON, νυχθημερον, the natural day, or day and night, which together, always make twenty-four hours. See the articles DAY and NIGHT.

NYCTALOPIA, in medicine, a two-fold diſorder of the eye, one of which is oppoſite to the other. In the firſt, the ſight is beſt in the night, and in obſcure places; whereas, in a clear light, their ſight fails, ſo that they can hardly ſee any thing. In the other ſort of nyctalopia, the patient can ſee nothing at all except in a clear and bright light.

As theſe infirmities ariſe from a natural bad formation of the eye, they are therefore incurable.

NYCTANTHES, Arabian-jaſmine, in botany, a genus of plants, whoſe flower is monopetalous and ſaucer-ſhaped, divided at the top into eight oblong ſegments: the ſtamina are two ſubulated filaments, topped with erect antheræ: the fruit is a roundiſh berry, having two cells, each containing a large roundiſh ſeed.

NYCTICORAX, a bird of the heron-kind, called in Engliſh the night-raven, by reaſon it flies chiefly in the night-time, and makes a very diſagreeable croaking.

NYMPH, in mythology, an appellation given to certain inferior goddeſſes inhabiting the mountains, woods, waters, &c. ſaid to be the daughters of Oceanus and Tethys.

NYMPH, among naturaliſts, that ſtate of winged inſects, between their living in the form of a worm, and their appearing in the winged or moſt perfect ſtate.

The eggs of inſects are firſt hatched into a kind of worms, or maggots; which afterwards paſs into the nymph-ſtate, ſurrounded with ſhells or caſes of their own ſkins; ſo that, in reality, theſe nymphs are only the embryo-inſects, wrapped up in this covering; from which they at laſt get looſe, though not without great difficulty.

During the nymph-ſtate, the creature loſes its motion. Swammerdam calls it nympha aurelia, or ſimply aurelia; and others give it the name of chryſalis, a term of the like import. See the article CHRYSALIS.

NYMPHÆ, in anatomy, two membranaceous parts, ſituated on each ſide the rima.

They are of a red colour and cavernous ſtructure, ſomewhat reſembling the wattles under a cock's throat. They are ſometimes ſmaller, ſometimes larger, and are continuous to the præputium of the clitoris, and joined to the interior ſide of the labia.

NYMPHÆA, the water-lily, in botany, a genus of plants, the flower of which conſiſts of a number of petals, uſually fifteen; they are ſmaller than the cup, and are inſerted into the ſide of the germen in more than a ſingle ſeries: the fruit is an oval fleſhy berry, containing a great many roundiſh ſeeds.

The root of this plant was recommended by the ancients as an aſtringent for internal uſe, and as a ſtyptic to ſtop the bleeding of wounds, or other hæmorrhages.

NYMPHEUM, in antiquity, a public hall, magnificently decorated, for entertainment, &c. and where thoſe, who wanted convenience at home, held their marriage feaſts; whence the name.

NYMPHOMANIA, in medicine the ſame with furor uterinus. See FUROR.

NYMPHOTOMIA, in ſurgery, the operation of cutting the nymphæ, when too large. See the article NYMPHÆ.

NYSSA, in botany, a genus of plants, producing male and hermaphrodite flowers; they are both deſtitute of a corolla; but the cup is divided into five ſegments, and ſpreads open: the fruit is an ovate unilocular drupe, containing an oval acute nut.

O.

OAK

O, The fourteenth letter, and fourth vowel of our alphabet, pronounced as in the words *noſe*, *roſe*, &c.

The ſound of this letter is often ſo ſoft, as to require it double, and that chiefly in the middle of words; as *gooſe*, *proof*, &c. and in ſome words this *oo* is pronounced like *u* ſhort, as in *flood*, *blood*, &c.

As a numeral, O is ſometimes uſed for eleven; and with a daſh over it, thus Ō, for eleven thouſand.

OAK-Tree, *Quercus*, in botany, a genus of plants, producing male and female flowers; the male are diſpoſed in a looſe amentum, each having a monophyllous cup, divided into four or five ſegments; there is no corolla, but ſeveral very ſhort filaments topped with large twin antheræ: the cup of the female flower is formed of a ſingle, rough, coriaceous, hemiſpherical leaf, undivided at the edge; the germen is ovate and ſmall; the ſtyle is five-pointed and longer than the cup, and the ſtigmata are ſingle and perſiſtent: the fruit is an oval nut (commonly called an acorn) covered with a coriaceous ſubſtance, the baſe of it being placed in the cup.

There are ſeveral ſpecies of oak, but the ſort which is moſt commonly known, grows naturally in England in many places. It is ſaid, that an oak-tree is an hundred years coming to its full growth, an hundred in perfection, and an hundred years decaying.

The great advantages ariſing from plantations of this tree, is ſo well known to the nation, that it is ſcarce neceſſary to inform the reader of its great uſe in civil and, particularly, naval architecture, there being no timber in the world ſo good for ſhip-building as the Engliſh oak, which makes our formidable fleets as much ſuperior in the ſtrength of their parts and for durability, as our ſeamen are in ſkill and courage to thoſe of other nations.

The bark of the oak-tree is of very great ſervice in tanning leather, and its acorns are excellent food for hogs.

OAK

The excellency of this noble plant is ſo univerſally known, that to offer any thing in order to encourage its greater increaſe, would be needleſs, ſeeing that all our gentlemen of fortune are not only judges of its great uſe, but at this time are principally devoted to the pleaſures and profit of planting in general, wherein the oak has a place not inferior to any.

This advantageous plant is raiſed from the acorn, which ſhould be ſown immediately after its falling from the tree, which is about the beginning of November; and is always beſt when the acorn is planted in the place appointed for its future growth: but when it cannot be ſo ordered, they muſt be ſown in a ſeed-bed, at about two or three inches aſunder in the rows, and nine or ten inches row from row. In the ſpring, the plants will appear, when they muſt be kept clear from weeds; and the following October they may be tranſplanted in rows three feet aſunder, and eighteen inches in the rows, obſerving not to ſuffer the plants to abide long out of the ground at the time of tranſplanting; here they may remain for three or four years, at which time they will be large enough to be tranſplanted where they are intended to remain for good: the ſeaſon for this work is in autumn, at which time, if they are carefully taken up, there will be little danger of their ſucceeding, but the heads ſhould by no means be ſhortened, which is too much practiſed; all that ſhould be done, is only to cut off any bruiſed or ill-placed branches, which ſhould be taken off cloſe to the place where they are produced.

The ſoil in which the oak-tree makes the greateſt progreſs, is a deep rich loam, in which it grows to the largeſt ſize; and the timber of thoſe trees which grow upon this land, is generally more pliable than that which grows on a ſhallow or drier ground, but the wood of the latter is much more compact and hard. Indeed, there are few ſoils in England in which the oak will not grow, provided there is proper care taken in their cultivation, though this tree will not thrive equally in all ſoils; but yet it might be cultivated to a national advantage, upon many

large

large waſtes in ſeveral parts of England, as alſo to the great profit of the eſtates where theſe tracts of land now lie uncultivated and produce nothing to the owner.

The proper diſtance that oaks ſhould be planted from each other, in woods, groves, parks, &c. ſhould not be leſs than thirty feet.

There are a great number of trees that go under the name of oak in divers parts of the world, but there is no where ſo many different kinds as in America, though the wood is not near ſo valuable as the Engliſh oak.

In times of ſcarcity, a great many poor people have made bread of the acorns; and the poets tell us, they were the food of the golden-age: however, they are heavy, windy, and hard to digeſt; therefore mankind, in thoſe early ages, muſt doubtleſs have had a better digeſtion than us.

The leaves of the oak are ſtyptic, a little bitteriſh, and all parts of it are aſtringent; they have often been preſcribed in all ſorts of hæmorrhages and fluxes of the belly.

OAK *of Jeruſalem*, in botany. See the article CHENOPODIUM.

Poiſon-OAK. See TOXICODENDRUM.

OAKAM, old ropes untwiſted, and pulled out into looſe hemp, in order to be uſed in caulking the ſeams, tree-nails, and bends of a ſhip, for ſtopping or preventing leaks.

OAR, in navigation, a long piece of wood, made round where it is to be held in the hand, and thin and broad at the other end, for the eaſier cutting and reſiſting the water, and conſequently moving the veſſel, by rowing.

Oars for ſhips are generally cut out of fir-timber, thoſe for barges are made out of New-England or Dantzic rafters, and thoſe for boats, either out of Engliſh aſh, or fir-rafters from Norway. See the article ROWING.

OAT, *Avena*, in botany, a genus of plants, whoſe flowers grow in looſe particles; the cup is a bivalvular glume; the corolla conſiſts of two valves, the lower one being of the ſame ſize with the cup, putting out from the back a ſpiral awn or beard, which is jointed and reflexed: the ſtamina are three capillary filaments, topped with oblong forked antheræ: the corolla ſerves as a pericarpium, ſurrounding a ſingle ſeed, which is oblong and ſwelling, pointed at each end, having a longitudinal furrow, and ſhut up in the chaff.

There are three ſorts of oats cultivated in England, viz. the common or white oat, the black oat, and the brown or red oat; the firſt ſort is more common about London, the ſecond in the northern parts, and the red oats are cultivated in Derbyſhire, Staffordſhire, and Cheſhire, and are a very hardy ſort.

Oats are a very profitable grain, and abſolutely neceſſary, being the principal grain which horſes love, and are eſteemed the moſt wholeſome food for thoſe uſeful animals, it being ſweet and of an opening nature, other grains being apt to bind, which is injurious to labouring horſes.

Oats will thrive on cold barren ſoils which will produce no other ſort of grain, it will alſo grow on the hotteſt land; in ſhort, there is no land too rich or too poor for it, too hot or too cold, but it will grow on it; and in wet harveſts, when other grain is ſpoiled, this will receive but little or no damage; the ſtraw and huſks being of ſo dry a nature, that if they are houſed wet, they will not heat in the mow and become mouldy, as other grain uſually do.

The ſeaſon for ſowing oats is in February or March, according to the nature of the land, and as the ſeaſon is early or late.

The meal of this grain makes tolerable good bread, and is the common food of the country people in the north; and in the ſouth, it is eſteemed for pottage and other uſes. Thoſe who feed upon it, are generally very healthy, which is a ſign that it yields good nouriſhment. Oatmeal blunts the acrimony of the humours, is cooling, and carries off acrimoneous ſalts by the urinary paſſages: flummery with milk, is uſed by many as a cooling diet in hot weather; and water-gruel is every where known for its inoffenſive properties.

OATH, *Juſjurandum*, is a ſolemn affirmation, in which the perſons ſworn invoke the Almighty to witneſs that their teſtimony is true, renouncing all claim to his mercy, and calling for his vengeance if it be falſe; on which account ſuch an oath is termed ſacramentum, a holy band, or tie; and it is alſo called a corporal oath, becauſe the perſon who takes it, lays his right-hand on the book of the Evangeliſts.

All oaths muſt be adminiſtered by a perſon duly authorized, and in order to diſcover truth and right; and therefore, if a perſon not duly authorized, adminiſters an oath, he is puniſhable both with fine and impriſonment.

A perſon who is to be a witneſs in a cauſe, may have two oaths adminiſtered to him; the one to ſpeak the truth, in relation to what the court ſhall think fit to aſk him, concerning himſelf or any thing elſe that is not evidence in the cauſe; and the other purely to give evidence in the cauſe wherein he is produced as a witneſs; the former of which is called an oath upon a voyer dire.

By ſtatute, all that bear offices of any kind under the government, members of the houſe of commons, eccleſiaſtical perſons, members of colleges, ſchoolmaſters, ſerjeants at law, counſellors, attornies, ſollicitors, advocates, proctors, &c. are required to take the oath of allegiance, ſupremacy, and abjuration; all perſons neglecting, or refuſing, to take theſe oath, are declared to be incapable of executing their offices and employments, of ſuing at law,

of being guardians, executors, &c. and are liable to the forfeiture of 500*l.* 13 W. III. c. 6. 1 Ann. c. 22. and 1 Geo. I. c. 13.

OBADIAH, or *the Prophecy of* OBADIAH, a canonical book of the Old Teſtament, which is contained in one ſingle chapter, and is partly an invective againſt the cruelty of the Edomites, who mocked and derided the children of Iſrael, as they paſſed into captivity, and with other enemies, their confederates, invaded and oppreſſed thoſe ſtrangers, and divided the ſpoil among themſelves: and partly a prediction of the deliverance of Iſrael, and of the victory and triumph of the whole church over her enemies.

OBEDIENCE, or OBEDIENTIA, in the canon law, is ſometimes uſed for an office, or the adminiſtration of it. In our antient cuſtoms obedientia was uſed, in the general, for every thing that was enjoined the monks by the abbots: and in a more limited ſenſe it was applied to the farm belonging to the abbey, to which the monks were ſent vi ejuſdem obedientiæ, either to look after the farm, or collect the rents. Hence, theſe rents themſelves were alſo called obedientiæ.

OBELISCOTHECA, in botany, a name given to the rudbeckia of Linnæus. See the article RUDBECKIA.

OBELISK, in architecture, a truncated, quadrangular, and ſlender pyramid, raiſed as an ornament, and frequently charged either with inſcriptions or hieroglyphics.

OBELISK, †, in grammar, a mark in form of a dagger, uſed to refer the reader to a note in the margin, at the ſide or bottom of a page.

OBJECT, in philoſophy, ſomething apprehended, or preſented to the mind, by ſenſation or by imagination.

Chauvinus defines an object to be that about which a power, act, or habit is employed: thus, good is the object of the will, truth of the underſtanding; and, in like manner, colour is the object of ſight, ſound of hearing, &c.

OBJECT GLASS *of a Teleſcope, or Microſcope*, the glaſs placed at the end of the tube which is next the object. See the articles TELESCOPE and MICROSCOPE.

OBJECTION, ſomething urged to overthrow a poſition, or a difficulty raiſed againſt an allegation, or propoſition of a perſon we are diſputing withal.

OBJECTIVE is uſed, in the ſchools, in ſpeaking of a thing which exiſts no otherwiſe, than as an object known. The exiſtence of ſuch a thing is ſaid to be objective.

This word is alſo uſed for the power, or faculty, by which any thing becomes intelligible; and for the act itſelf, whereby any thing is preſented to the mind and known.

OBIT, among Chriſtians, a funeral ſolemnity, or office for the dead, moſt commonly performed when the corpſe lies in the church uninterred.

It likewiſe ſignifies the anniverſary office, or annual commemoration of the dead, performed yearly on the day of their death, with prayers, alms, &c. In religious houſes they have a regiſter, in which they enter the obits of their founders, or benefactors, which is thence termed the obituary.

OBLATI, in church-hiſtory, were ſecular perſons, who devoted themſelves and their eſtates to ſome monaſtery, into which they were admitted as a kind of lay-brothers. The form of their admiſſion was, putting the bell-ropes of the church round their necks, as a mark of ſervitude. They wore a religious habit, but differed from that of the monks.

OBLATION, a ſacrifice, or offering made to God. See SACRIFICE.

OBLIGATION, in general, denotes any act whereby a perſon becomes bound to another, to do ſomething; as to pay a ſum of money, be ſurety, or the like.

Obligations are of three kinds, viz. natural, civil, and mixed. Natural obligations are entirely founded on natural equity; civil obligations, on civil authority alone, without any foundation in natural equity; and mixed obligations are thoſe which being founded on natural equity, are farther enforced by civil authority.

OBLIQUE, in geometry, ſomething aſlant, or that deviates from the perpendicular. Thus an oblique angle, is either an acute or obtuſe one, *i. e.* any angle except a right one. See ANGLE.

OBLIQUE ASCENSION, in aſtronomy. See the article ASCENSION.

OBLIQUE CASES, in grammar, are all the caſes except the nominative. See CASE.

OBLIQUE DESCENSION, in aſtronomy. See the article DESCENSION.

OBLIQUE LINE, that which, falling on another line, makes oblique angles with it, viz. one acute, and the other obtuſe.

OBLIQUE PERCUSSION, in mechanics. See the article PERCUSSION.

OBLIQUE PLANES, in dialling, are thoſe which recline from the zenith, or incline towards the horizon. See the articles DIAL and PLANE.

The obliquity, or quantity of this inclination, or reclination, may be found by means of a quadrant.

OBLIQUE SAILING, in navigation, is when a ſhip ſails upon ſome rhumb between the four cardinal points, making an oblique angle with the meridian; in which caſe, ſhe continually changes both latitude and longitude.

Oblique ſailing is of three kinds, viz. plain-ſailing, Mercator's ſailing, and great circle-ſailing. See the article NAVIGATION.

OBLIQUE SPHERE, is where the pole is elevated any number of degrees leſs than 90°; in

which caſe, the axis of the world, the equator, and parallels of declination will cut the horizon obliquely. See the article SPHERE.

OBLIQUITY *of the Ecliptic.* See the article ECLIPTIC.

OBLIQUUS, in anatomy, oblique, a name given to ſeveral muſcles, particularly in the head, eyes, and abdomen. See FRONTAL MUSCLES.

OBLONG, in general, denotes a figure that is longer than broad: ſuch is a parallelogram, ellipſis, &c. See the articles PARALLELOGRAM and ELLIPSIS.

OBLONGATA MEDULLA, in anatomy. See MEDULLA and BRAIN.

OBOLARIA, in botany, a genus of plants, whoſe flower is monopetalous and unequal; the tube is campanulated and ventricoſe, and the limb divided into four ſegments; it hath four awl-ſhaped ſtamina, two of which are larger than the others. The fruit is an oval, compreſſed, ventricoſe capſule, formed of two valves, containing a great number of ſeeds in form of very fine powder.

OBOLUS, in antiquity, an antient Athenian coin.

OBSCURE, ſomething that is dark and reflects little light, or that is not clear and intelligible.

Obſcurity, in this laſt ſenſe, ariſes from hence, that we do not conceive and expreſs things as they are, but as we judge them to be, before we have fully examined them.

OBSCURO, or CLARO-OBSCURO. See CLARO-OBSCURO.

OBSEQUIES, the ſame with funeral ſolemnities. See the articles BURIAL, FUNERAL, &c.

OBSERVANCE, in a monaſtic ſenſe, denotes a community of religious, tied to the perpetual obſervation of the ſame rule.

OBSERVATION, among navigators, ſignifies the taking the ſun's, or a ſtar's meridian altitude, in order thereby to find the latitude. See LATITUDE.

Cæleſtial OBSERVATIONS. See COELESTIAL.

OBSERVATORY, a place deſtined for obſerving the heavenly bodies; being, generally, a building erected on ſome eminence, covered with a terrace for making aſtronomical obſervations.

OBSIDIONALIS, an epithet applied by the Romans to a ſort of crown. See the article CROWN.

OBSTRUCTION, in medicine, ſuch an obturation of the veſſels, as prevents the circulation of the fluids, whether of the ſound and vital, or of the morbid and peccant kind, through them; ariſing from an exceſs of the bulk of the fluid to be tranſmitted, above the capacity of the veſſel which ought to tranſmit it.

OBTURATOR, in anatomy, a name for the two muſcles of the thigh, one of which is the marſupialis, and is called obturator internus, and the other the obturator externus. Theſe two muſcles ſhut up the foramen or aperture between the os pubis and the hip-bone. The obturator internus comes from the internal circumference of the hole that is between the iſchium and the os pubis; and paſſing through the ſinuoſity of the iſchium, it is inſerted into the dent of the great trochanter. Its tendon lies between the gemini: it turns the thigh to the outſide. The obturator externus comes from the external circumference of the ſame hole as the former; it embraces the neck of the thigh-bone, and paſſes under the quadratus to the ſmall cavity of the great trochanter.

OBTUSE, ſignifies blunt, dull, &c. in oppoſition to acute, ſharp, &c. thus we ſay obtuſe angle, obtuſe angled triangle, &c. See the article ANGLE, &c.

OCCATION, a term in the antient huſbandry, by which they expreſſed what we do by harrowing, though they performed it with a different inſtrument; being a kind of rake, with the teeth of which they levelled the ground, and broke the clods; and with the hand ſtrewed the corn over this level ground. Then they brought on the plough and ploughed it in, ſo that the grain was ſown in furrows, as we expreſs it, and uſually came up as we ſee it does at this time with us in the ſame caſe in the lower parts only. After it got a few leaves they went over the ground again with the ſame inſtrument, to clear away the weeds, and move the earth about the roots of the young plants.

OCCIDENT, in geography, the weſtward quarter of the horizon, or that part of the horizon where the ecliptic, or the ſun therein, deſcends into the lower hemiſphere, in contradiſtinction to orient. Hence we uſe the word occidental, for any thing belonging to the weſt, as occidental bezoard, occidental pearl, &c.

OCCULT, ſomething ſecret, hidden, or inviſible. The occult ſciences, are magic, necromancy, cabbala, &c.

OCCULT, in geometry, is uſed for a line that is ſcarce perceivable, drawn with the point of the compaſſes, or a leaden pencil. Theſe lines are uſed in ſeveral operations, as the raiſing of plans, deſigns of building, pieces of perſpective, &c. They are to be effaced when the work is finiſhed.

OCCULTATION, in aſtronomy, the time a ſtar or planet is hid from our ſight, by the interpoſition of the body of the moon, or of ſome other planet. See the article ECLIPSE.

Circle of perpetual OCCULTATION, is a parallel in an oblique ſphere, as far diſtant from the depreſſed pole, as the elevated pole is from the horizon. See the article HORIZON.

All the ſtars between this parallel and the depreſſed pole, never riſe, but lie conſtantly hid under the horizon of the place.

OCCUPANT, in law, the perſon that firſt ſeizes, or gets poſſeſſion of a thing; and this by law muſt

muſt be of what has a natural exiſtence, as of land, &c.

OCCUPATION, in a legal ſenſe, is taken for uſe or tenor, as in deeds it is frequently ſaid, that ſuch lands are, or lately were, in the tenure or occupation of ſuch a perſon. This is likewiſe uſed for a trade or myſtery.

OCCUPATION, or OCCUPANCY, in the civil law, denotes the poſſeſſion of ſuch things as at preſent properly belong to no private perſon; but are capable of being made ſo, as by ſeizing or taking of ſpoils in war, by catching things wild by nature, as birds and beaſts of game, &c. or by finding things before undiſcovered, or loſt by their proper owners.

OCEAN, in geography, that vaſt collection of ſalt and navigable waters, in which the two continents, the firſt including Europe, Aſia, and Africa, and the laſt America, are incloſed like iſlands. The ocean is diſtinguiſhed into three grand diviſions. 1. The Atlantic ocean, which divides Europe and Africa from America, which is generally about three thouſand miles wide. 2. The Pacific ocean, or South-ſea, which divides America from Aſia, and is generally about ten thouſand miles over: and 3. The Indian Ocean, which ſeparates the Eaſt-Indies from Africa, which is three thouſand miles over. The other ſeas, which are called oceans, are only parts or branches of theſe, and uſually receive their names from the countries they border upon.

OCHNA, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh petals; the filaments are numerous, ſhort, and connivent, and topped with roundiſh antheræ. The fruit is a very large, truncated, and fleſhy receptacle, containing on each ſide a ſingle berry, with a ſingle oval ſeed.

OCHRE, *Ochra*, in natural hiſtory, a genus of earths, ſlightly coherent, and compoſed of fine, ſmooth, ſoft, argillaceous particles, rough to the touch, and readily diffuſible in water.

Ochres are of various colours, as red, yellow, blue, brown, green, &c. Of the red there are eleven ſpecies, of the yellow as many, of blue one, of brown two, of green one, and of black two. All which have, at one time or other, been uſed in painting.

OCIMUM, baſil, in botany. See the article BASIL.

OCTAETERIDES, in chronology, denotes a cycle of eight years, at the end of which, three entire lunar months were added.

This cycle was in uſe at Athens, till Meton diſcovered the golden number.

OCTAGON, or OCTOGON, in geometry, is a figure of eight ſides and angles: and this, when all the ſides and angles are equal, is called a regular octagon, or one which may be inſcribed in a circle. If the radius of a circle circumſcribing a regular octagon be $= r$, and the ſides of the octagon be $= y$; then $y = \sqrt{\overline{2r}^2 - r\sqrt{\overline{2r}^2}}$.

OCTAGON, in fortification, denotes a place that has eight baſtions. See the article FORTIFICATION.

OCTAHEDRON, or OCTAEDRON, in geometry, one of the five regular bodies, conſiſting of eight equal and equilateral triangles. See the article SOLID.

The ſquare of the ſide of the octahedron is to the ſquare of the diameter of the circumſcribing ſphere, as 1 to 2.

If the diameter of the ſphere be 2, the ſolidity of the octahedron inſcribed in it will be 1,33333, nearly.

The octahedron is two pyramids put together at their baſes, therefore its ſolidity may be found by multiplying the quadrangular baſe of either of them, by one third of the perpendicular height of one of them, and then doubling the product.

OCTANDRIA, the name of the eighth claſs in the Linnæan ſyſtem of botany: it comprehends all thoſe plants whoſe flowers are hermaphrodite and furniſhed with eight ſtamina or male parts in each. To this claſs belong the Indian creſs, knot-graſs, tree-primroſe, French willow, &c.

OCTANT, or OCTILE, in aſtronomy, that aſpect of two planets, wherein they are diſtant an eight part of a circle, or 45° from each other.

OCTOSTYLE, in the ancient architecture, is the face of an edifice adorned with eight columns.

The eight columns of the octoſtyle may either be diſpoſed in a right line, as in the Pantheon, and the pſeudodiptere temple of Vitruvius; or in a circle, as in the round monothere temple of Apollo Pythius at Delphi, &c.

OCULUS, the eye, in anatomy. See the article EYE.

ODE, in poetry, a ſong, or a compoſition proper to be ſung.

Among the antients, ode ſignified no more than ſongs; but with us they are very different things. The antient odes were generally compoſed in honour of their gods, as many of thoſe of Pindar and Horace.

Theſe had originally but one ſtanza, or ſtrophe, but afterwards they were divided into three parts, the ſtrophe, the antiſtrophe, and the epode. The prieſts going round the altar ſinging the praiſes of the gods, called the firſt entrance, when they turned to the left, the ſtrophe; the ſecond, turning to the right, they called antiſtrophe, or returning; and, laſtly, ſtanding before the altar, they ſung the remainder, which they called the epode.

ODOROUS, or ODORIFEROUS, appellations given to whatever ſmells ſtrongly, whether they be fetid or agreeable; but chiefly to things whoſe ſmell is briſk and agreeable.

ODYSSEE,

ODYSSEE, ὀδυσσεια, a celebrated epic poem of Homer, wherein are related the adventures of Ulyſſes, in his return from the ſiege of Troy. See the articles EPIC and ILIAD.

The moral of the odyſſee is, that a perſon's abſence from home, ſo that he cannot have an eye to his affairs, occaſions great diſorders; and, accordingly, the hero's abſence is the principal and moſt eſſential action of the whole poem.

OECONOMICS, the art of managing the affairs of a family, or community; and hence the perſon who takes care of the revenues and other affairs of churches, monaſteries, and the like, is termed œconomus.

OECONOMY, οικονομια, denotes, the prudent conduct, or diſcreet and frugal management, whether of a man's own eſtate, or that of another.

Animal OECONOMY, comprehends the various operations of nature, in the generation, nutrition, and preſervation of animals.

OECUMENICAL, ſignifies the ſame with general, or univerſal; as œcumenical council, biſhop, &c.

OEDEMA, or PHLEGMATIC TUMOUR, in medicine and ſurgery, a ſort of tumour attended with paleneſs and cold, yielding little reſiſtance, retaining the print of the finger when preſſed with it, and accompanied with little or no pain. See the article TUMOUR.

OENANTHE, water-dropwort, in botany, a genus of plants, producing umbellated flowers, the univerſal corolla is difform and radiated; the proper flowers which form the diſc are hermaphrodite, and compoſed of five inflexo-cordated petals; thoſe of the rays are male, and have five large, unequal, bifid petals. The fruit is compoſed of two oval ſeeds, convex and ſtriated on one ſide, and plane on the other.

A ſpecies of this genus, called hemlock dropwort, grows naturally by the ſides of ditches and rivers in divers parts of England; it commonly grows four or five feet high, with ſtrong jointed ſtalks, which being broken, emit a yellowiſh fetid juice; the leaves are ſomewhat like thoſe of the common hemlock, but are of a lighter green.

This plant is one of the moſt poiſonous we know of; the juice, which is at firſt like milk, turns afterwards to a ſaffron colour; if a perſon ſhould ſwallow ever ſo little of this juice, it will ſo contract every part it touches, that there will immediately follow a terrible inflammation and gangrene; and what is worſe, there has not hitherto been found any antidote againſt it; for which reaſon it ought to be very carefully avoided.

OENELÆUM, in pharmacy, a mixture of wine and oil, uſually of thick black wine and oil of roſes; ſaid to be good for anointing wounds, to prevent an inflammation.

OENOTHERA, tree-primroſe, in botany, a genus of plants, whoſe flower conſiſts of four cordated plane petals, with eight ſubulated incurved filaments inſerted in the tube of the calyx, and terminated with oblong incumbent antheræ. The fruit is a four-cornered, cylindraceous capſule, formed of four valves, and the ſame number of cells, containing a number of naked, angulated ſeeds.

This genus comprehends the onagra of Tournefort.

OESOPHAGUS, in anatomy, the gula, or gullet, is a membranaceous canal, reaching from the fauces to the ſtomach, and conveying into it the food taken in at the mouth. Its figure is ſomewhat like that of a funnel, and its upper part is called by anatomiſts the pharynx. Its ſituation is almoſt exactly behind the aſpera arteria, and longitudinally with the vertebræ of the neck and back; but when it enters the cavity of the thorax, it turns a little to the right, on account of the aorta.

OFFICE, a particular charge or truſt, or a dignity attended with a public function.

OFFICE alſo ſignifies a place or apartment appointed for officers to attend in, in order to diſcharge their reſpective duties and employments.

OFFICE, in architecture, denotes all the apartments appointed for the neceſſary occaſions of a palace or great houſe; as kitchen, pantries, confectionaries, &c.

OFFICE, in the canon-law, is uſed for a benefice that has no juriſdiction annexed to it.

OFFICER, a perſon poſſeſſed of a poſt or office.

Commiſſion-OFFICERS, are thoſe appointed by the king's commiſſion; ſuch are all from the general to the cornet, incluſive, who are thus denominated in contradiſtinction to warrant officers, who are appointed by the colonel's or captain's warrant; as quarter-maſters, ſerjeants, corporals, and even chaplains and ſurgeons.

Field-OFFICERS are ſuch as command a whole regiment; as the colonel, lieutenant-colonel, and major.

General-OFFICERS are thoſe whoſe command is not limited to a ſingle company, troop, or regiment; but extends to a body of forces, compoſed of ſeveral regiments: ſuch are the general, lieutenant-general, major-generals, and brigadiers.

Staff-OFFICERS are ſuch as, in the king's preſence, bear a white ſtaff, or wand; and at other times, on their going abroad, have it carried before them by a footman bare-headed: ſuch are the lord-ſteward, lord-chamberlain, lord-treaſurer, &c.

The white ſtaff is taken for a commiſſion, and at the king's death each of theſe officers breaks his ſtaff over the hearſe made for the king's body, and thus lays down his commiſſion, and diſcharges all his inferior officers.

Subaltern OFFICERS are all who adminiſter juſtice

ſtice in the name of ſubjects; as thoſe who act under the earl-marſhal, admiral, &c. In the army, the ſubaltern officers are the lieutenants, cornets, enſigns, ſerjeants, and corporals.

OFFICINAL, in pharmacy, an appellation given to ſuch medicines, whether ſimple or compound, as are required to be conſtantly kept in the apothecaries ſhops.

OFFING, or OFFIN, in the ſea-language, that part of the ſea a good diſtance from ſhore, where there is deep water, and no need of a pilot to conduct the ſhip: thus, if a ſhip from ſhore be ſeen ſailing out to ſeaward, they ſay, ſhe ſtands for the offing; and if a ſhip, having the ſhore near her, have another a good way without her, or towards the ſea, they ſay, that ſhip is in the offing.

OFF-SETS, in gardening, are the young ſhoots that ſpring from the roots of plants; which being carefully ſeparated, and planted in a proper ſoil, ſerve to propagate the ſpecies.

OFF-SETS, in ſurveying, are perpendiculars let fall, and meaſuring from the ſtationary lines to the hedge, fence, or extremity of an encloſure.

OGEE, or O. G. in architecture, a moulding, conſiſting of two members, the one concave, and the other convex; or, of a round and a hollow, like an S. See the article MOULDING and CYMATIUM.

OGIVE, in architecture, an arch, or branch of a gothic vault; which, inſtead of being circular, paſſes diagonally from one angle to another, and forms a croſs with the other arches.

OIL, *Oleum*, in natural hiſtory, an unctuous inflammable ſubſtance, drawn from ſeveral natural bodies, as animal and vegetable ſubſtances.

OIL-MILL, one that ſerves to bruiſe or break the nuts, olives, and other fruits and grains, whoſe juice is to be drawn by expreſſion, to make oil.

OIL-NUT. See the article RICINUS.

OIL-TREE. See RICINUS.

OINTMENT, or UNGUENT, in pharmacy and ſurgery. See UNGUENT.

OLDENLANDIA, in botany, a genus of plants, whoſe flower conſiſts of four oval patent petals, which are a little longer than the cup; it hath four ſtamina, topped with ſmall antheræ. The fruit is a round capſule, with two cells, which are filled with many ſmall ſeeds.

OLEA, the olive-tree, in botany. See the article OLIVE.

OLEAGINOUS, ſomething that partakes of the nature of oil, or out of which oil may be expreſſed.

OLEANDER, *Nerium*, in botany. See NERIUM.

OLEASTER, *Elæagnus*, in botany. See the article ELÆAGNUS.

OLECRANUM, in anatomy, the poſterior apophyſis of the ulna, ſerving to form the eminence of the elbow.

OLFACTORY NERVE, the firſt pair of the head; ſo called from their being the immediate inſtruments of ſmelling.

OLIBANUM, frankincenſe, in pharmacy, a dry reſinous ſubſtance, brought to us in detached pieces, or drops as it were, like thoſe of maſtic; but larger, and of a leſs pure and pellucid texture.

It is of a pale yelloviſh-white colour, but with ſome mixture of a browniſh caſt in it. It is moderately heavy; its ſmell is ſtrong, but not diſagreeable; and its taſte bitter, acrid, and reſinous.

The earlieſt accounts we have of any thing, tell us that frankincenſe was in uſe among the ſacred rites and ſacrifices; and it is uſed in many different parts of the world at this time, to the ſame purpoſes. As well, however, as the world has been at all times acquainted with the drug itſelf, we are not yet well acquainted with its hiſtory. The country which produces it is a much diſputed point among authors: ſome affirm it was never found any where but in Arabia, and there only in that part called Sabæa, or, from this famous product, Arabia Thurifera: others are for bringing it from Ethiopia; and others from other places. If we are uncertain as to the place whence the olibanum is brought, we are much more as to the tree that produces it.

Olibanum is greatly commended by many againſt diſorders of the head and breaſt, and againſt diarrhœas and dyſenteries, and profluvia of the menſes, and fluor albus. Its doſe is from ten grains to a drachm. It is eſteemed by many a ſpecific in pleuriſies, eſpecially when epidemic.

Externally it is uſed in fumigations for diſorders of the head, and againſt catarrhs; and is an ingredient in ſome plaſters. It is a noble balſam in conſumptions, given in ſubſtance, or diſſolved with the yolk of an egg, into the form of an emulſion. There is an oil made of it per deliquium, in the ſame manner as that of myrrh: this is done by putting the powder of it into the white of a boiled egg, in a cellar, till it runs into a liquor; this is eſteemed a great coſmetic, and deſtroyer of pimples in the face. Dioſcorides had his doubts about the internal uſe of olibanum in large doſes; he talks of its bringing on madneſs, and even death; but none of the other Greek writers ſay any thing of its ill qualities, nor do we at preſent know any of them.

OLIGARCHY, a form of government, wherein the adminiſtration of affairs is lodged in the hands of a few perſons.

OLIVARIA CORPORA, in anatomy, two eminences of the medulla oblongata; ſo called from their reſembling an olive in ſhape.

OLIVE-TREE, *Olea*, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is cylindraceous and the length of the cup, and the limb is divided into four ſegments, which ſpread open; the ſtamina are two ſhort ſubulated filaments, topped with erect antheræ. The fruit is

a ſmooth, oval, unilocular drupe, incloſing an ovato-oblong wrinkled nut, with a kernel of the ſame ſhape.

There are ſeveral ſorts of olive trees; the manured kind has a ſmooth aſh-coloured bark and yellowiſh wood that has ſomewhat of a bitteriſh taſte. The leaves are placed oppoſite, by pairs, and are oblong and narrow, almoſt like thoſe of the willow, of a light green on their upper ſide, and hoary underneath. The flowers come out from the wings of the leaves in bunches, they are ſmall and white, and are ſucceeded by the fruit, which ripens in autumn in the ſouthern countries of Europe, where this plant is much cultivated. Olive trees will grow in almoſt any ſoil; in rich moiſt ground they grow larger than in poor land, but the fruit is of leſs eſteem, becauſe the oil made from it is not ſo good as that which is produced in a poorer ſoil. Chalky ground ſeems to ſuit them beſt, for the oil produced from trees growing on that kind of land is much finer, and will keep longer good, than any other. In this country, olive trees are kept more for curioſity than uſe; they are planted in pots or tubs, and preſerved in green-houſes in the winter. Olives are very oily and ſmooth, and therefore not good for the ſtomach, being apt to pall and relax it too much, as moſt things of the like properties generally do. This fruit is brought over to us pickled in ſalt and water, and the oil which is expreſſed from the fruit is alſo imported, and is of common uſe for ſallads, &c. it is accounted heating, emollient, and vulnerary, and good againſt coſtiveneſs and the gripes.

Wild-OLIVE, *Elæagnus*, in botany. See the article ELÆAGNUS.

OLIVE-COLOUR, a yellow mingled with black. See COLOUR.

OLYMPIAD, ολυμπιας, in chronology, the ſpace or period of four years, whereby the Greeks reckoned time; for the epocha or commencement of which, ſee the article EPOCHA.

OLYMPIC GAMES, were ſolemn games, famous among the ancient Greeks, ſo called from Olympian Jupiter, to whom they were dedicated; and by ſome ſaid to be firſt inſtituted by Jupiter, after his victory over the ſons of Titan: others aſcribe this inſtitution to Hercules, not the ſon of Alcmena, but one of much greater antiquity; others to Pelops; and others, to Hercules the ſon of Alcmena. Theſe games were ſo conſiderable, that the Greeks made them their epocha, diſtinguiſhing their years by the return of the olympics.

OMBRE, a celebrated game at cards, borrowed from the Spaniards, and played by two, three, or five perſons, but generally by three.

OMBRE DE SOLEIL, ſhadow of the ſun, in heraldry, is when the ſun is borne in armory, ſo as that the eyes, noſe, and mouth, which at other times are repreſented, do not appear; and the colouring is thin, ſo that the field can appear through it.

OMEN, a certain accident and caſual occurrence, that was thought to preſage either good or evil.

OMENTUM, or EPILOON, the cawl, in anatomy, a membranaceous part, uſually furniſhed with a large quantity of fat; being placed under the peritonæum, and immediately above the inteſtines.

It is called by ſome rete, and reticulum, from the number of holes appearing in it, when raiſed, and giving it the reſemblance of a net.

As to its ſituation, it uſually occupies only the upper part of the abdomen; though it is ſometimes found extended to the lower part: its weight in a perſon not remarkably fat or lean, is about half a pound: its lower part is evidently looſe and free; but in its upper part it is joined, anteriorly, to the bottom of the ſtomach, the duodenum, and the ſpleen; and poſteriorly to the colon and pancreas.

It is compoſed of a very tender double membrane, forming a kind of pouch or cavity, called its burſa, and replete with fat, lodged in certain cellules, forming a kind of ducts, with certain areolæ, or membranaceous ſpaces between them.

Its arteries come from the cœliac, and are very numerous; its veins ariſe chiefly from the ſplenic branch of the vena portæ; and its nerves are from the intercoſtals and the par vagum. See the articles ARTERY, VEIN, &c.

It has a very remarkable aperture, by which it may be conveniently diſtended by inflation; and there are generally ſome ſmall holes in it, though the large ones, from which it got the name rete, are adventitious.

The uſes of the omentum are, 1. by its lubricity, to render the natural and neceſſary motions of the inteſtines eaſy: 2. to cheriſh and defend the inteſtines from cold: 3. to aſſiſt in the formation of the bile, the fatty part of which is wholly owing to the veſſels of the omentum; every thing that returns from this part going to the liver: 4. to temperate the acrimony of the humours: and, probable, 5. to ſerve as all the other fat of the body, to give it nouriſhment, when it is incapable of being nouriſhed any other way.

OMPHALEA, in botany, a genus of plants, producing male and female flowers; the male flower hath no corolla; the cup is cut into four ſegments, and contains an ovate receptacle, on the ſide of which are placed two or three antheræ: the female flower is like the male, excepting the generative parts; it hath a very ſhort roundiſh germen, with a cylindric ſtyle, and a broad, obtuſe, and almoſt trifid ſtigma: the fruit is ovate, fleſhy, and trilocular, and the ſeeds are ſolitary and oblong.

ONAGRA, in botany, a name given by Tourne-

fort

fort to the oenothera of Linnæus. See the article OENOTHERA.

ONANIA, or ONANISM, terms which ſome late empirics have framed, to denote the crime of ſelf-pollution, mentioned in ſcripture to have been practiſed by Onan, and puniſhed in him with death.

ONDEE, in heraldry, the ſame with wavy. See WAVY.

ONEIROCRITICA, ονειροκρίτικη, the art of interpreting dreams, or predicting future events from dreams.

ONGLEE, in heraldry, an appellation given to the talons or claws of beaſts or birds, when borne of of a different colour from that of the body of the animal.

ONION, *Cepa*, in botany, a genus of plants, having a bulbous root, conſiſting of various coats, the outermoſt of which are membranaceous, and the inner ones fleſhy, with many fibres at the bottom; the leaves are long, fiſtular, round, and ſharp at the points; the ſtalk is naked, upright, and riſing to about four or five feet high; it is hollow, and ſwells out in the middle, on the top of which the flowers are collected in a ſpherical head; each flower conſiſts of ſix oblong petals, with ſix ſubulated filaments, topped with oblong erect antheræ: the fruit is a broad, ſhort, three-cornered capſule, having three cells and three valves, and contains a number of roundiſh angular ſeeds, of a black colour.

Onions are propagated by ſowing their ſeeds in the ſpring, on good rich ſandy ground; and when they are grown up about three inches high, they ſhould be hoed out at about four or five inches aſunder, leaving them ſingly; this is beſt done in dry weather, which ſhould be repeated twice more, in order to keep the weeds from over running them; in Auguſt the onions will be at their full growth, which is known by their blades falling to the ground, and ſhrinking; but before they are quite withered, they ſhould be drawn out, cropping off the extreme part of the blade and laying them on a dry ſpot, keeping them removed for a time till they are fit for houſing, where they may be kept for winter uſe; reſerving ſome of the firmeſt, largeſt, and beſt ſhaped, in the ſpring, to plant for ſeed, which, when run up, ſhould be ſtaked, to prevent the winds from blowing them down.

Onion-ſeed alſo may be ſown in beds in the month of Auguſt, for a ſupply in the ſpring; and likewiſe they may be ſown in the ſpring, in beds, to draw up for young ſallads, after the Michaelmas onions are grown too large for that purpoſe.

There are ſeveral ſorts of onions, as the Straſburgh onion, Spaniſh onion, Portugal onion, &c.

Onions are chiefly uſed for culinary purpoſes, and are eaten raw by ſome, and roaſted by others, but are more commonly boiled: they are windy, heating, and cauſe thirſt, and therefore are bad for hot conſtitutions; however, when boiled and mixed with honey, they are good in diſorders of the lungs, ariſing from a thick clammy phlegm: they are alſo in great eſteem to draw and ſuppurate all kinds of tumours; roaſted, and applied to the ear, they help to ripen, break, and cleanſe away, impoſthumations in the head, which ſometimes cannot be influenced by any other means: a cataplaſm of roaſted onions and freſh-butter, is an excellent external application for the piles.

This genus is included by Linnæus among the alliums, or garlic. See ALLIUM.

ONOCLEA, in botany, a genus of plants of the fern kind, the fructifications of which grow in a cluſtered ſpike; it hath a globoſe unilocular capſule, opening with five valves, which are lanceolated and acute: the ſeeds are numerous, ſmall, duſty, and hairy.

ONOMATOPOEIA, in grammar and rhetoric, a figure where words are formed to reſemble the ſound made by the things ſignified; as the buz of bees, the cackling of hens, &c.

ONONIS, reſt-harrow, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is cordated, ſtriated, and depreſſed on the ſides; the alæ are ovate, and ſhorter than the vexillum; and the carina is acuminated, and longer than the alæ: the fruit is a turgid, rhomboidal, unilocular pod, containing a few reniform ſeeds.

There are ſeveral ſpecies belonging to this genus, but the common ſort (known by the name of the prickly reſt-harrow) which grows naturally in many parts of England, with purple flowers, has a ſtrong creeping root, which ſpreads far in the ground; the ſtalks are ſlender, rough, reddiſh, hairy, and full of prickles; they are beſet with leaves of a roundiſh form, ſlightly crenated, hairy, of a dark green colour, and glutinous to the touch.

The root and leaves of this plant are accounted attenuant and diſcutient, being chiefly preſcribed in the piles, jaundice, and obſtructions of the viſcera.

ONOPORDUM, woolly-thiſtle, in botany, a genus of plants, producing compound tubuloſe flowers; the proper ones are monopetalous and funnel-ſhaped: the ſeeds are ſingle, crowned with a hairy down, and placed in the cup.

The common onopordum, which grows naturally in many parts of England, is a biennial plant, with many large downy leaves, which are ſinuated at their edges, and are prickly; the ſtalks are four or five feet high, dividing upwards into many branches, and are terminated by ſcaly heads of purple flowers, which come out in June.

This ſpecies is ſaid to be good againſt cancers, &c.

ONOSMA, in botany, a genus of plants, whoſe flower is monopetalous and campanulated, with a very ſhort tube; the ſtamina are five ſhort ſubulated filaments, topped with erect arrow-ſhaped antheræ: there is no pericarpium; but the cup, which is immutable, contains four ovate ſeeds.

ONTOLOGY, or ONTOSOPHY, the ſcience or doctrine of being, in the general or abſtract; coinciding with what is otherwiſe called metaphyſics.

ONYX, in natural hiſtory, one of the ſemi-pellucid gems, with variouſly coloured zones, but none red; being compoſed of cryſtal, debaſed by a ſmall admixture of earth; and made up either of a number of flat plates, or of a ſeries of coats ſurrounding a central nucleus, and ſeparated from each other by veins of a different colour, reſembling zones or belts.

OOST, a kiln for drying hops after they are picked from the ſtalks.

OPACITY, in philoſophy, a quality of bodies which renders them impervious to the rays of light. See LIGHT.

OPAL, in natural hiſtory, a gem of a very peculiar kind, and has been eſteemed by many, in all ages, of very great value; though at preſent it is of leſs value, in proportion to its ſize, than any of the finer gems.

It is ſofter than any other of the fine gems, and is difficult to poliſh to any degree of nicety: it is found of various ſhapes and ſizes; its moſt frequent bigneſs is between that of a pea and a horſe-bean; but it is found as ſmall as the head of a large pin, and has been ſeen of the ſize of a large walnut. Its figure is very various and uncertain, but it is never found in a chryſtalliform or columnar ſtate; its moſt uſual ſhape is an irregularly oblong one, convex above, flatted at bottom, and dented with various ſinuoſities at its ſides.

It is often found among the looſe earth of mountains, ſometimes on the ſhores of rivers, and not unfrequently bedded in the coarſer kinds of jaſper. It is found in Egypt, Arabia, ſome parts of the Eaſt-Indies, and in many parts of Europe; thoſe of Europe are principally from Bohemia, and are of a greeniſh or greyiſh colour; the colour of other opals much reſemble the fineſt mother of pearl, its baſis ſeeming a bluiſh or greyiſh white, but with a property of reflecting all the colours of the rainbow, as turned differently to the light.

OPALIA, in antiquity, feaſts celebrated at Rome in honour of the goddeſs Ops.

OPEN FLANK, in fortification, that part of the flank which is covered by the orillon. See the article FLANK.

OPENING *of Trenches*, is the firſt breaking of ground by the beſiegers, in order to carry on their approaches towards a place. See TRENCH.

OPERA, a dramatic compoſition ſet to muſic, and ſung on the ſtage, accompanied with muſical inſtruments, and enriched with magnificent dreſſes, machines, and other decorations.

OPERATION, in general, the act of exerting or exerciſing ſome power or faculty, upon which an effect follows.

OPERATION, in ſurgery and medicine, denotes a methodical action of the hand on the human body, in order to re-eſtabliſh health.

OPERATIONS, in chemiſtry, denote the proceſſes or experiments whereby bodies are changed agreeably to the rules of the art, and to the end propoſed therein.

OPHIOGLOSSUM, adder's-tongue, in botany, a genus of cryptogamious plants of the fern kind; the root hath many fibres gathered together, from which ariſe, on a pedicle, a ſingle leaf, which is fleſhy, ſmooth, upright, and without nerves; from that part of the leaf that joins to the pedicle, there proceeds a ſpike which reſembles a ſerpent's tongue, that terminates in a point, and is dentated on each ſide like a file; it is divided into ſeveral ſmall cells, which contain a great number of very ſmall oval ſeeds, like meal or duſt, which are thrown out when ripe.

Adder's-tongue grows wild, in moiſt meadows, in ſeveral parts of England; it is accounted a vulnerary, and is uſed both externally and internally, and is thought to be good for ulcers when bruiſed and applied as a cataplaſm.

OPHIORHIZA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped, and the limb cut into five obtuſe patent ſegments; it hath five ſlender filaments, topped with oblong antheræ. The fruit is a broad bilobate capſule, containing many angulated ſeeds.

OPHIOXYLON, in botany, a genus of the polygamia-monoecia claſs of plants, the hermaphrodite flowers are monopetalous and infundibuliform, with five very ſhort filaments topped with pointed antheræ; the male flower hath a cylindric nectarium in the mouth of the corolla, with two very ſhort ſtamina. The fruit is a double berry, having two cells, and the ſeeds are ſolitary and roundiſh.

OPHITES, in natural hiſtory, a ſort of variegated marble, of a duſky-green ground, ſprinkled with ſpots of a lighter green, otherwiſe called ſerpentine.

OPHITES, in church hiſtory, Chriſtian heretics, ſo called from the veneration they had for the ſerpent that tempted Eve, and the worſhip they paid to a real ſerpent: they pretended that the ſerpent was Jeſus Chriſt, and that he taught men the knowledge of good and evil: they diſtinguiſhed between Jeſus and Chriſt; Jeſus, they ſaid, was born of the Virgin, but Chriſt came down from heaven to be united with him: Jeſus was crucified, but Chriſt had left him, to return to heaven. They diſtinguiſhed the God of the Jews, whom they termed Jaldabaoth, from the ſupreme God; to the former they aſcribed the body, to the latter the ſoul of men. They had a live ſerpent, which they kept in a kind of cage; at certain times they opened the cage door and called the ſerpent; the animal came out, and mounting

mounting upon the table, twined itſelf about ſome loaves of bread; this bread they broke, and diſtributed it to the company, who all kiſſed the ſerpent: this they called their euchariſt.

OPHRYS, twyblade, in botany, a genus of plants, whoſe flower conſiſts of five oblong petals, four of which are aſcendend, and join, and the lower one is bifid; it hath a dependent nectarium, which is carinated; behind the ſtamina are two very ſhort filaments, topped with erect antheræ. The fruit is an oval, three-cornered, obtuſe capſule, with one cell, opening with three valves, containing a great number of ſmall ſeeds like duſt.

OPHTHALMIA, *οφθαλμια*, in medicine, an inflammation of the membranes which inveſt the eye; eſpecially of the adnata, or albugineous coat. See the article EYE.

OPHTHALMICS, medicines good in diſorders of the eyes. See EYE.

OPHTHALMIC NERVES, the fifth pair of the head. See the article NERVE.

OPIATES, medicines of a thicker conſiſtence than a ſyrup, prepared with opium ſcarcely fluid. They conſiſt of various ingredients, made up with honey or ſyrup; and are to be uſed for a long time either for purgative, alterative, or corroborative intentions. Hence there are opiates of three kinds; that is, of a purgative, an alterative, and of a corroborating quality.

OPINION, is defined to be an aſſent of the mind to propoſitions not evidently true at firſt ſight.

OPIUM, in the materia medica, is an inſpiſſated juice, partly of the reſinous, and partly of the gummy kind, brought to us in cakes from eight ounces to a pound weight. It is very heavy, of a denſe texture, and not perfectly dry; but in general, eaſily receives an impreſſion from the finger: its colour is a browniſh yellow, ſo very dark and duſky that at firſt ſight it appears black: it has a dead and faint ſmell, and its taſte is very bitter and acrid. It is to be choſen moderately firm, and not too ſoft; its ſmell and taſte ſhould be very ſtrong, and care is to be taken that there is no dirty or ſtony matter in it.

Opium is the juice of the papaver album, or white poppy, with which the fields of Aſia Minor are in many places ſown, as ours are with corn. When the heads are near ripening, they wound them with an inſtrument that has five edges, which on being ſtuck into the head makes at once five long cuts in it; and from theſe wounds the opium flows, and is next day taken off by a perſon who goes round the field, and put up in a veſſel which he carries faſtened to his girdle: at the ſame time that this opium is collected, the oppoſite ſide of the poppy head is wounded, and the opium collected from it the next day. They diſtinguiſh however the produce of the firſt wounds from that of the ſucceeding ones, for the firſt juice afforded by the plant is greatly ſuperior to what is obtained afterwards. After they have collected the opium, they moiſten it with a ſmall quantity of water or honey, and work it a long time upon a flat, hard, and ſmooth board, with a thick and ſtrong inſtrument of the ſame wood, till it becomes of the conſiſtence of pitch; and then work it up with their hands, and form it into cakes or rolls for ſale.

Opium at preſent is in great eſteem, and is one of the moſt valuable of all the ſimple medicines: applied externally it is emollient, relaxing and diſcutient, and greatly promotes ſuppuration; if long kept upon the ſkin it takes off the air, and always occaſions an itching in it; ſometimes it exulcerates it, and raiſes little bliſters if applied to a tender part. Laid on the perinæum it promotes venereal inclinations; and ſometimes, on external application, it allays pain, and even occaſions ſleep: but it muſt by no means be applied to the head, eſpecially to the ſutures of the ſkull, for it has been known to have the moſt terrible effects in this application, and even to bring on death itſelf.

Opium, taken internally, removes melancholy, eaſes pain and diſpoſes to ſleep; in many caſes removes hæmorrhages, provokes ſweating, and is a provocation to venery; and in general has a greater effect on women and children than on men. A moderate doſe is commonly under a grain, though according to the circumſtances two grains, or even three may be within the limits of this denomination; but cuſtom will make people bear a dram or more, tho' in this caſe nature is vitiated, and nothing is to be hence judged in regard to others. If given diſſolved, it operates in half an hour; if in a ſolid form, as in pills, or the like, it is ſometimes an hour and a half. Its firſt effect, in this caſe, is the making the patient cheerful, as if he had drank moderately of wine, and at the ſame time bold and above the fear of danger; for which reaſon the Turks always take it, when they are going to battle. A very immoderate doſe brings on a ſort of drunkenneſs, much like that occaſioned by an immoderate quantity of ſtrong liquors; cheerfulneſs and loud laughter at firſt, then a relaxation of the limbs, a loſs of memory, and lightheadedneſs; then vertigoes, dimneſs of the eyes, with a laxity of the cornea and a dilatation of the pupils, a flowneſs of the pulſe, redneſs of the face, relaxation of the under jaws, ſwelling of the lips, difficulty of breathing, painful erection of the penis, convulſions, cold ſweats, and finally death. Thoſe who eſcape are uſually relieved by a great number of ſtools, or profuſe ſweats. People who have gradually accuſtomed themſelves to an immoderate uſe of opium, are ſubject to relaxations and weakneſſes of all the parts of the body: they are apt to be faint, idle and thoughtleſs; and are generally in a ſtupid and uncomfortable ſtate, except juſt after

after they have taken a freſh doſe, in ſhort, they loſe their appetite, and grow old before their time.

Prepared opium, commonly called extract of opium, is made by diſſolving opium in a ſufficient quantity of water with a gentle heat; then ſtraining the ſolution from the fæces, and evaporating it to the conſiſtence of honey. Tincture of opium, or liquid laudanum, otherwiſe called the thebaic tincture, is made as follows: take of prepared opium two ounces; of cinnamon and cloves, each one drachm; of white-wine, one pint: infuſe them a week without heat, and then filtre it through paper. Quincy obſerves of this preparation, that the addition of the ſpices are of no uſe.

OPOBALSAMUM, in the materia medica, the ſame with the true balſam. See the article BALSAM.

OPOPANAX, in the materia medica, is a gum-reſin of a tolerably firm texture, uſually brought to us in looſe granules or drops, and ſometimes in large maſſes, formed of a number of theſe, connected by a quantity of matter of the ſame kind; but theſe are uſually loaded with extraneous matter, and are greatly inferior to the pure looſe kind. The drops or granules of the fine opopanax, are on the outſide of a browniſh red-colour, and of a duſky-yellowiſh or whitiſh colour within: they are of a ſomewhat unctuous appearance, ſmooth on the ſurface, and are to be choſen in clear pieces, of a ſtrong ſmell, and acrid taſte.

Opopanax is attenuating and diſcutient, and is gently purgative; it diſpels flatulencies, and is good in aſthmas, in inveterate coughs, and in diſorders of the head and nerves. It alſo promotes the menſes, and is good againſt all obſtructions of the viſcera.

OPOSSUM, in zoology, a ſpecies of didelphis, with the paps within the abdomen. See DIDELPHIS.

The opoſſum is a very ſingular animal, about fifteen inches long from the extremity of the noſe to the rump; and its tail is equal in length to the whole body: the legs are robuſt, and the feet armed with ſharp, long and crooked claws. But what is moſt ſingular in this animal, is that the ſkin of the belly of the female is looſe, forming a kind of pouch or bag, with an aperture in it, at which, in time of danger, it takes in its young.

OPPONENT, a perſon who withſtands or oppoſes another.

This term is chiefly uſed in ſcholaſtic or academic diſputes or exerciſes, where a perſon who oppoſes a theſis, or impugns it by his objections, is called opponent.

OPPOSITES, *Oppoſita*, among logicians, ſimply taken, are ſuch things as differ among themſelves, but ſo as not to differ in like manner from ſome third.

OPPOSITION, in logic, the diſagreement between propoſitions, which have the ſame ſubject and the ſame predicate.

OPPOSITION, in aſtronomy, is that aſpect or ſituation of two ſtars or planets, wherein they are diametrically oppoſite to each other, or 180° aſunder.

OPPOSITION, in geometry, the relation of two things, between which a line may be drawn perpendicular to both.

OPPOSITION, in rhetoric, a figure whereby two things are joined, which ſeem incompatable; as *a wiſe folly*.

OPTATIVE Mood, in grammar, that which ſerves to expreſs an ardent deſire or wiſh for ſomething. See the article MOOD.

OPTICS, *Optica*, taken properly and ſimply, is that ſcience which teaches the properties of direct viſion; but in a larger ſenſe, it may comprehend the whole doctrine of light and colours, and all the phænomena of viſible objects. In this large ſenſe, the incomparable Sir Iſaac Newton calls his book of light and colours, optics; or it is a mathematical ſcience that treats of light in general, and of every thing that is ſeen with direct rays; and explains the ſeveral properties and effects of viſion in general, and properly of that which is direct and ordinary. For when the rays of light are conſidered as reflected, the ſcience which teaches their laws and properties, is called catoptrics; and when the refraction of rays is conſidered, and the laws and nature of it explained and demonſtrated, the ſcience is called dioptrics. So that optics comprehends the whole, of which catoptrics and dioptrics are the two parts.

OPULUS, marſh elder, in botany, an umbelliferous plant, growing naturally in marſhy lands in ſeveral parts of England; it riſes to the height of ſixteen or eighteen feet, and is divided into ſeveral branches which come out oppoſite, and are apt to grow irregular; they are covered with a ſmooth aſh coloured bark, are very tender and brittle, and full of a white ſpungy pith: the leaves are placed oppoſite, and are large and angular, jagged on their edges, and of a light green. The flowers are monopetalous and campanulated, quinquifid at the limb, and reflexed; they come out at the ends of the branches in June, and grow in large umbels; they are of a white colour, and are ſucceeded by oval berries, which when ripe are of a ſcarlet colour.

OPUNTIA, the Indian fig, in botany, a genus of plants, whoſe flower is compoſed of ſeveral obtuſe, concave petals, placed in a circular order; the filaments are numerous, ſubulated, inſerted in the cup, and terminated by oblong erect antheræ; the fruit is a fleſhy umbilicated berry, with one cell containing a number of ſmall roundiſh ſeeds. There are ſeveral kinds of opuntia, which are all natives of America; they are armed with ſpines, which come

come out in cluſters on the ſides of the leaves, or rather branches, as they have no proper leaves; they grow either in a ramoſe form in ſome ſpecies, or dichotomous in others, and are kept in our green-houſes among other ſucculent plants, for the ſingularity of their appearance. Theſe plants are eaſily propagated by cutting off their branches, at the joints, in the ſummer months, which ſhould be laid in a warm dry place for ſometime to heal the wounded part; after which they may be planted in a dry rubbiſh ſoil, giving them but little water, as they are very ſucculent, which would otherwiſe rot them; and to have them in perfection, they ſhould not be expoſed to the open air at any time, for they thrive much better when kept under glaſſes. It is on a ſpecies of opuntia that the cochineal animal feeds. See cochineal. This genus is included by Linnæus, among the cactus, which ſee.

OR, in heraldry, denotes yellow or gold-colour. See Colour and Metal.

ORACLE, among the heathens, was the anſwer which the gods were ſuppoſed to give to thoſe who conſulted them upon any affair of importance; it is alſo uſed for the god who it was thought gave the anſwer, and the place where it was given.

ORACH, *Atriplex*, in botany. See the article Atriplex.

ORAL, ſomething delivered by word of mouth, without being committed to writing; in which ſenſe we ſay, oral law, oral tradition, &c.

ORANGE, *Aurantium*, in botany, an ever-green-tree; it hath a thick, woody, branched root, which ſpreads very much, and is of a yellow colour withinſide; the trunk is hard, whitiſh within, has an agreeable ſmell, and is covered with a browniſh ſmooth bark; the branches are numerous, flexible, of a beautiful green, and armed with a few thorns; the leaves are thick, ſmooth, broad, of an oval-lanceolated form, ending in a point with a foliated pedicle, in the ſhape of a heart (by which it is diſtinguiſhed from the lemon and citron trees) and when held up to the light there appears a ſort of ſmall holes in them: the flowers grow in bunches, and are roſaceous, each conſiſting of a monophyllous cup, indented in five parts: the corolla is compoſed of five white, oblong, patent petals, with many filaments, topped with yellow oblong antheræ; in the center is placed an orbicular germen, which ſuſtains a cylindrical ſtyle, crowned with a globoſe ſtigma, becoming afterwards a well-known globular fleſhy fruit, divided into nine cells, each containing two oval callous ſeeds.

There are ſeveral kinds of orange-trees, as the Seville orange, the China orange, the willow-leaved orange, the ſhaddock orange, the dwarf or nutmeg orange, the curled-leaved orange, the ſtriped curled-leaved orange, the double-flowering orange, the horned orange, the large-warted orange, with other varieties, which are cultivated in England more for curioſity than uſe.

Orange-trees are propagated by inoculation, on ſtocks raiſed from the kernels, which ſhould be ſown on a moderate hot-bed, in the ſpring; and when the plants are up three or four inches, they ſhould be planted ſingly in ſmall pots in good rich earth, and plunged into a freſh bed, obſerving to keep them ſhaded till they are properly rooted, and alſo to keep them well watered in hot-weather; in autumn they ſhould be put in the green-houſe, where they may remain till the ſpring, when it would not be amiſs to plunge them again in a moderate hot-bed which will greatly facilitate their growth; and by hardening them by degrees as the ſummer advances, they will be fit for inoculation in Auguſt, which is the proper ſeaſon for that operation on this plant; at which time, choice ſhould be made of cuttings from healthy and fruitful trees, obſerving that the ſhoots are round and the buds not ridged, ſuch ſeldom ſucceeding. When the ſtocks are inoculated, they ſhould be plunged in a moderate warmth, whether tan or dung (tan is beſt) and covered with glaſſes, giving proper air at times: in about a month it will be diſcoverable what buds have taken (at which time the bandage ſhould be looſened); after which, they ſhould be ſheltered in the green-houſe, and in the ſpring, headed down within two or three inches of the bud, which will ſoon put forth its ſhoot, which ſhoot ſhould be trained, by degrees, as it advances, in order to form a handſome tree; as they increaſe in ſize, they ſhould occaſionally be ſhifted into larger pots; once in two years will be ſufficient.

If old orange-trees have been miſmanaged, ſo as their tops are become unſightly or partly decayed, the beſt method to reſtore them, is to take them out of the tubs or pots in the ſpring, pruning their roots and heads, plant them into freſh earth, and plunge them into a tan-bed in a hot-houſe, where they may continue the ſucceeding ſummer and winter, by which time they will have renewed their heads; when they may be placed among the others which are in good order.

Orange-trees may alſo be trained againſt a wall, in the manner peaches are, and frames of glaſs placed ſlopewiſe over them in winter, which may be ſo contrived as to be removed quite away in ſummer; by this method the fruit will be very large, and more numerous than thoſe kept in the common way; alſo the fruit will ripen well, and be fit for uſe; but it will be proper to have a flue in the front in winter (an iron or tin one is beſt, as it can eaſily be moved away in ſummer) by which means there will be no hazard of loſing the trees in ſevere winters.

The flowers of orange-trees are juſtly eſteemed one of the fineſt perfumes, and though little uſed in

medicine, yet the water diſtilled from them is accounted ſtomachic, cordial, and carminative. The peel of oranges is an excellent bitter, it ſtrengthens the ſtomach, helps digeſtion, attenuates groſs humours, diſcuſſes wind, and eaſes the cholic; it is an ingredient in tinctures, which, mixed with wine and drank before dinner, creates an appetite: the eſſential oil diſtilled from the rind, is alſo proper for the ſame uſes when two or three drops are taken upon ſugar, as well as the peel when it is candied. The pulp of ſweet oranges is cooling, quenches thirſt, and excites the appetite; but the juice of ſour oranges, not only ſerves to make a cooling drink in hot weather, but is of late found to be excellent againſt the ſcurvy.

Mock-ORANGE, *Philadelphus*, in botany. See PHILADELPHUS.

ORANGE-COLOUR, among dyers, one that partakes equally of red and yellow. See the articles COLOUR and DYEING.

ORANGERY, in gardening, a green-houſe, purpoſely adapted for the preſervation of orangtre es in winter: it alſo denotes a well ſheltered place, where orange trees are placed without doors in the ſummer ſeaſon.

ORATION, in rhetoric, a ſpeech or harangue, compoſed according to the rules of oratory, and ſpoke in public.

ORATORY, *Oratoria*, the art of ſpeaking well, otherwiſe called rhetoric. See the article RHETORIC.

ORB, *Orbis*, in aſtronomy, &c. denotes an hollow globe or ſphere. See the articles GLOBE and SPHERE.

ORBICULARE Os, in anatomy, a little bone of the ear, ſo called from its figure. See the article EAR.

ORBICULARIS, in anatomy, an appellation given to the conſtrictor-muſcle of the lips; as alſo to the conſtrictor of the upper eye-lid, which is ſingle, and riſes from the upper apophyſis of the maxillary bone, near the larger canthus of the eye, and ſurrounds the eye-lid with a ſeries of orbicular fibres, ſerving to ſhut it; and, in this action, it alſo depreſſes and draws forward the eye-brow, and elevates the lower eye-lid.

Some alſo give the name of orbicularis inteſtini, to the ſphincter of the anus.

ORBIS MAGNUS, in aſtronomy, denotes the earth's orbit, in its annual revolution round the ſun.

ORBIT, *Orbita*, in aſtronomy, the path of a planet or comet, or the curve that it deſcribes in its revolution round its central body: thus the earth's orbit is the curve which it deſcribes in its annual courſe, and uſually called the ecliptic. See the article ECLIPTIC.

ORCHARD, a plantation of fruit-trees. In planting an orchard, great care ſhould be taken that the ſoil is ſuitable to the trees planted in it; and that they are procured from a ſoil nearly of the ſame kind, or rather poorer than that laid out for an orchard. As to the ſituation, an eaſy riſing ground, open to the ſouth-eaſt, is to be preferred. Mr. Miller recommends planting the trees fourſcore feet aſunder, but not in regular rows; and would have the ground between the trees plowed, and ſown with wheat and other crops, in the ſame manner as if it was clear from trees, by which means the trees will be more vigorous and healthy, will abide much longer, and produce better fruit. If the ground has been paſture, the green-ſward ſhould be plowed in the ſpring before the trees are planted; and if it be ſuffered to lie a ſummer fallow, it will greatly mend it, provided it be ſtirred two or three times to rot the graſs and prevent the growing of weeds. At Michaelmas it ſhould be plowed pretty deep, in order to make it looſe for the roots of the trees, which if the ſoil be dry, ſhould be planted in October; but if it be moiſt, the beginning of March will be a better ſeaſon. If ſeveral ſorts of fruit trees are to be planted on the ſame ſpot, you ſhould obſerve to plant the largeſt growing trees backwards, and ſo proceed to thoſe of leſs growth, continuing the ſame method quite through the whole plantation; by which means the ſun and air will more eaſily paſs through the whole orchard. When you have planted the trees, you ſhould ſupport them with ſtakes, to prevent their being blown out of the ground by the wind; and the following ſpring, if the ſeaſon ſhould prove dry, cut a quantity of green turf, and lay it about the roots, with the graſs downwards; by which means a great expence of watering will be ſaved; and after the firſt year they will be out of danger. Whenever you plow the ground betwixt theſe trees, you muſt be careful not to go too deep amongſt their roots, which would greatly damage the trees; but if you do it cautiouſly, your ſtirring the face of the ground will be of great ſervice to them: though you ſhould obſerve, never to ſow too near the tree, nor to ſuffer any great rooting weeds to grow about them; becauſe this would ſtarve them, by exhauſting the goodneſs of the ſoil, which every two or three years ſhould be mended with dung or other manure, that will be abſolutely neceſſary for the crops ſown between. Theſe trees, after they are planted out, will require no other pruning beſides cutting off their bad branches, or ſuch as croſs each other.

ORCHESTRA, in the antient theatres, a place in the form of a ſemi-circle, where the dancing was performed.

ORCHIS, in botany, a genus of plants, whoſe flower hath five petals with a nectarium of a corniculated form, with two very ſhort ſlender filaments joining to the pointal, with oval erect antheræ. The fruit is an oblong unilocular capſule, with three carinated valves opening on the ſides, but cohering

bering at the top and bottom, the ſeeds are numerous and very ſmall like duſt. There are ſeveral ſpecies of orchis which grow wild in divers parts of England; the odd appearance and beauty of their flowers makes them well deſerving of a place in gardens; they are propagated by their roots, which are compoſed of two tubercles almoſt round, fleſhy, and of the ſize of nutmegs; the leaves are in moſt ſorts oblong, ſome of which are ſpotted; the ſtalks riſe to the height of a foot, and are round, ſtreaked, and encompaſſed with one or two leaves; and on the top is placed a ſpike of flowers in May or June. Orchis is accounted a reſtorative and ſtrengthener in weak decaying conſtitutions.

ORDEAL, a form of trial, or of diſcovering innocence or guilt, formerly practiſed over almoſt all Europe, and which prevailed in England from the time of Edward the confeſſor, till it was aboliſhed by a declaration of Henry III. It was called purgatio vulgaris, or judicium, in oppoſition to bellum or combat, the other form of purgation; and was of various kinds, as that of fire, that of red hot iron, that of water, that of judicial pottage, that of hallowed cheeſe, that of the green croſs, and that of dice laid on relics covered with a woollen cloth. To each of which kinds particular maſſes were appointed.

In England, an offender, on being arraigned and pleading not guilty, had it in his choice to put himſelf upon God and his country; that is upon the verdict of a jury; or upon God alone, on which account it was called the judgment of God, it being preſumed that God would deliver the innocent. The more popular kinds of ordeal were thoſe of red-hot iron and water; the firſt for freemen and people of faſhion, and the laſt for peaſants. That by fire as practiſed here, was the perſon's walking bare-footed and blindfold over nine red-hot plough ſhares; and if he eſcaped unhurt, he was acquitted, otherwiſe condemned. That of water was of two kinds, viz. either with hot water or cold; the former was where the perſon ſuſpected put his arm or leg into ſcalding water, and brought it out unhurt; and the latter was when his body was not, contrary to the courſe of nature, borne up by the water.

ORDER, in architecture, is a ſyſtem of the ſeveral members, ornaments and proportions of columns and pilaſters; or a regular arrangement of the projecting parts of a building, eſpecially the column, ſo as to form one beautiful whole.

M. Le Clerc defines an order to be a column charged with an intablature, and ſupported on a pedeſtal.

ORDER is alſo uſed for a diviſion or claſs of any thing: thus the tribe of animals called birds, is ſubdivided into ſix orders. See the article ORNITHOLOGY.

Holy ORDERS, a character peculiar to eccleſiaſtics, whebrby they are ſet apart for the miniſtry. See ORDINATION.

Military ORDERS, are companies of knights, inſtituted by kings and princes; either for defence of the faith, or to confer marks of honour, and make diſtinctions among their ſubjects.

Religious ORDERS, are congregations or ſocieties of monaſtics, living under the ſame ſuperior, in the ſame manner, and wearing the ſame habit.

ORDERS of curves, in geometry. See the article CURVE.

ORDINANCE, or ORDONNANCE, a law ſtatute, or command of a ſovereign, or ſuperior: thus the acts of parliament are ſometimes termed ordinances of parliament.

ORDINARY, or *honourable* ORDINARY, in heraldry, a denomination given to certain charges properly belonging to that art. The honourable ordinaries are ten in number; viz. the chief, pale, bend, feſſe, bar, croſs, ſaltier, chevron, bordure, and orle. For which ſee CHIEF, PALE, &c.

ORDINATES, or ORDINATE APPLICATES, in geometry, are parrallel lines, terminating in a curve, and biſſected by a diameter. The half of theſe, is properly the ſemi-ordinate, though commonly called ordinate. See CURVE, PARABOLA, HYPERBOLA, &c.

ORDINATION, the act of conferring holy orders, or of initiating a perſon into the prieſthood by prayer, and the laying on of hands. Ordination has always been eſteemed the principal prerogative of biſhops, and they ſtill retain the function as a mark of ſpiritual ſovereignty in their dioceſe. Without ordination, no perſon can receive any benefice, parſonage vicarage, &c. A clerk muſt be twenty three years of age before he can have any ſhare in the miniſtry; and twenty four, before he can be ordained, and by that means be permitted to adminiſter the ſacraments. A biſhop on the ordination of clergymen, is to examine them in the preſence of the miniſters who aſſiſt him at the impoſition of hands; and in caſe any crime, as drunkenneſs, perjury, forgery, &c. be alledged againſt any one that is be ordained, either prieſt or deacon, the biſhop ought to deſiſt from ordaining him. The perſon to be ordained is to bring a teſtimonial of his life and doctrine to the biſhop, and give an account of his faith in Latin, and both prieſts and deacons are obliged to ſubſcribe the thirty-nine articles.

ORDNANCE, a general name for all ſorts of great guns, uſed in war. See the articles CANNON and GUN.

ORDONNANCE, in painting, is uſed for the diſpoſition of the parts of a picture, either with regard to the whole piece, or to the ſeveral parts; as the groups, maſſes, contraſts, &c.

ORDONNANCE, in architecture, is the compoſition of a building, and the diſpoſition of is parts, both with regard to the whole, and to one another; or, as Mr. Evelyn expreſſes it, determining the meaſure of what is aſſigned to the ſeveral apartments.

ORE, in natural hiſtory, the compound mineral glebe, earth, ſtone, or other ſubſtance; which is rich enough in metallic particles, to be worth the while of being purified; and by this means to ſeparate the metal from it, whether gold, ſilver, copper, iron, tin, &c. See METAL, Gold, &c.

ORGAL, among dyers, denotes the lees of wine dried. See DYEING.

ORGAN, *οργανον*, in general, is an inſtrument, or machine, deſigned for the production of ſome certain action or operation; in which ſenſe, the mechanic powers, machines, and even the veins, arteries, nerves, muſcles, and bones of the human body, may be called organs. See the articles POWER, MACHINE, VEIN, ARTERY, &c.

ORGAN, in muſic, the largeſt and moſt harmonious wind-inſtrument.

The invention of the organ is very antient, tho' it is agreed that it was very little uſed till the eighth century. It ſeems to have been borrowed from the Greeks. Vitruvius deſcribes an hydraulic one in his tenth book of architecture.

Hydraulic ORGAN, denotes a muſical machine that plays by means of water inſtead of wind.

Of theſe there are ſeveral in Italy, in the grottoes of vineyards.

ORGASM, *Orgaſmus*, an extacy, or impetuous deſire of coition, occaſioned by a turgeſency of the ſeminal veſſels.

Certain female animals have an orgaſm at particular ſeaſons of the year.

ORGUES, in the military art, are thick, long, pieces of wood, pointed at one end, and ſhod with iron, clear one of another; hanging each by a particular rope, or cord, over the gate-way of a ſtrong place, perpendicularly, to be let fall in caſe of an enemy.

Their diſpoſition is ſuch, that they ſtop the paſſage of the gate, and are preferrable to herſes and portcullíſes; becauſe they may be either broke by a petard, or they may be ſtopped in their falling down; but a petard is uſeleſs againſt an orgue, for if it break one or two of the pieces, they immediately fall down again, and fill up the vacancy; or if they ſtop one or two of the pieces from falling, it is no hindrance to the reſt.

ORGUES, is alſo uſed for a machine, compoſed of ſeveral harquebuſs or muſquet-barrels, bound together, by means whereof ſeveral exploſions are made at the ſame time, uſed to defend breaches and other places attacked.

ORICHALCUM, or AURICHALCUM, braſs. See BRASS.

ORIENT, *Orient*, in geography and aſtronomy, the eaſt, or eaſt point of the horizon; thus called, becauſe it is the place where the ſun riſes.

Hence, the equinoxial orient is uſed for that point of the horizon wherein the ſun riſes, when he is in the equator, or when he enters the ſigns of Aries and Libra; æſtival orient, is the point wherein the ſun riſes in the middle of ſummer, when the the days are longeſt; and the hybernal orient, the point where the ſun riſes in the middle of winter, when the days are ſhorteſt.

ORIENTAL, ſomething ſituated towards the eaſt with regard to us, in oppoſition to occidental. See OCCIDENTAL.

ORIFICE, the mouth, or aperture of a tube, pipe, or other cavity.

It is alſo uſed for the aperture of a wound, or ulcer. See WOUND and ULCER.

ORIGENISTS, in church hiſtory, a Chriſtian ſect in the fourth century, ſo called from their drawing their opinions from the writings of Origen.

The Origeniſts maintained, that the ſouls of men had a pre-exiſtent ſtate, that they were holy intelligences, and had ſinned in heaven before the body was created; that Chriſt is only the ſon of God by adoption, that he has been ſucceſſively united with all the angelical natures, and has been a cherub, a ſeraph, and all the celeſtial virtues, one after another; that in future ages, he will be crucified for the ſalvation of the devils, as he has already been for that of men, and that their puniſhment, and that of the damned, will continue only for a certain limited time.

ORIGINAL, a firſt draught or deſign of any thing, which ſerves as a model to be imitated or copied.

ORIGINAL SIN, the crime of eating the forbidden fruit, of which it is ſaid, all mankind are guilty at their conception by the imputation of Adam's tranſgreſſion; which is accounted for by ſuppoſing that Adam, as he was to be the father, was alſo the fœderal head, and repreſentative of the whole human race; and that on his ſinning, all that were to ſpring from him partook of his crime.

ORILLON, in fortification, is a ſmall rounding of earth faced with a wall; raiſed on the ſhoulder of thoſe baſtions that have caſemates, to cover the cannon in the retired flank, and prevent their being diſmounted by the enemy.

ORION, in aſtronomy, one of the conſtellations of the ſouthern hemiſphere.

The word is formed from the Greek *βρειν*, to make water; the antients ſuppoſing that it raiſed tempeſts at its riſing and ſetting.

The ſtars in the conſtellation Orion, in Ptolemy's catalogue are 37, in Tycho's 62, in the Britannic catalogue 80. The names, ſituations, magnitudes, longitudes, and latitudes of which are as follow:

Names

Names and situations of the stars.	Signs.	Longitude.	Latitude South.	Magn.
		° ′ ″	° ′ ″	
Preced. and 6th in the lion's skin	♊	7.28.29	15.25.30	4
5th in the lion's skin		7.56.24	13.31.20	4
7th in the lion's skin		7.41.50	16.48.55	4
1st and north. in the lion's skin		9. 5. 5	8.16. 7	4 5
3d in the lion's skin		9.18. 1	11. 9.17	6
5.				
4th in the lion's skin		9.10.47	12.24. 1	4
8th in the lion's skin		8. 5.26	20. 2.56	4
2d in the lion's skin		9.56.24	9. 6.31	4 5
Last and south. in the lion's skin		9. 7.32	20.53.51	4 5
Preced. of 2 infor. towards the horn of Tau.		12. 7.50	7.25. 6	5
10.				
North. in the preced. arm		12.16.35	14.22.37	6
South. and subseq. in the arm		12.36. 1	13. 4.	6
Subs. of the infor. towards the horn of Tau.		13.23.27	7.21.32	5
That against the preced. side		13. 9.38	20. 7.24	4 5
That against the preced. arm		14.32.14	11.45.55	6
15.				
Bright one in preced. foot called regel		12.25.50	30.10.11	1
More north. over the heel		13.26.16	29.52.52	4
		14.42.32	20.30. 1	6
North. in the preced. side under the girdle		15. 9.36	23.31.19	5
Preced. and north. in the side		15.44.32	19.37.39	6
20.				
In the preced. shoulder		16.33.23	16.51.30	2
Preced. and south. in the back		16. 8.16	21.21. 7	5
South. in the preced. side under the girdle		15.51.13	24. 5.24	6
In the hilt of the sword		15.45.37	25.34.47	3
In the calf of the preced. leg		15. 9.37	30.57.44	5
25.				
Preced. of 4 in the back, as it were in a right line		16.46.40	20. 8.18	5
		17.19.12	24.21.29	6
That foll. the shoulder to the south.		17.58.40	17.20.29	5
2d of four in the back		17.57.	20. 9	6
Preced. in the girdle		17.57.28	23.36. 7	2
30.				
Under the point of the sword		17.29.55	30.35.12	4
Preced. in the head		19.11.41	13.51.19	5
In the back the 3d		18.46.56	19.34.10	6
In the head the north. of three		19.18. 8	13.25. 2	4
South. and subseq. of the head		19.42.18	14. 2.58	5
35.				
Preced. of the contig. in the middle of the sword		18.34.48	28.43.24	3 4
Prec. of the north. of the contig. in the mid. of the sword.		18.38. 1	28.10.17	5
Subseq. in the middle of the sword		18.36. 4	28.45. 2	4
South. in the sword		18.35. 7	29.14.37	3 4
Last of the north. in the sword		18.42.38	28.11.45	5
40.				
Middle of three in the girdle		19. 3.34	24.33.23	2
Last of four in the line of the back		20. 5.46	19.16. 3	5
That under the third of the girdle		19.41.31	25.58.47	4
Subseq. under the point of the sword		19.31.15	30.34.50	5
Third and last in the girdle		20.17.35	25.20.17	2
45.				
Preced. in the hind-side		20.53.24	21.56. 8	5
		22.28.27	16.59.55	6

Names and situations of the stars.	Signs.	Longitude.	Latitude South.	Magn.
		° ′ ″	° ′ ″	
In the hind-knee	♑	21.59 31	33. 7. 6	3
Preced. of two in the club		24.18.13	3.11.44	5
Latter of two in the hind-side		23.34.14	21.37.10	6
50.				
		24.25. 3	3 44. 1	6
Glittering star in the hind-shoulder		24.20.50	16. 4.26	1
		25.10.	21.38.50	6
That following the side out of form		25.16.31	22.56. 4	6
Preced. of those following the knee		25.19.22	33. 2. 4	6
55.				
		26.25. 3	3 47.31	5 6
In the lower part of the hind-arm		26 11.55	13.50. 1	4
Subseq. in the club		26.31.57	3.20.37	5
		26.17.28	18. 1.56	6
Last of the two subseq. of the knee		27. 7.57	34. 4.58	5 6
60.				
		26.54 50	19.19.18	6
Preced. in the south. in □ of hind-hand		27.27. 7	8.42.16	4 5
		28 26.15	3.39.59	6
Preced. of the north. in the square		28.30. 4	7.19.30	6
Last of the south. in the same		28.29.51	9 14.49	4 5
65.				
		29. 8.	4 16. 2	6
Last of the north.		29.19.59	7.17.31	6
		29.30.39	10 53.13	6
North. in the hind-ulna		29.41. 2	11.10.30	6
		29.49.32	29.42. 5	4 5
70.				
South. in the hind-ulna		29.55.50	13.28 25	6
		1.52.37	18.45.41	4
		3.29. 3	28. 3. 5	5
		3.51.38	30.18.32	4
Informes foll. Orion between Gemini and Canis major		4. 5 30	18.23.14	4
75.				
		4. 5. 3	15.54.21	4
		5.58. 1	13.13.14	4
		7.44.41	14 56.15	5
		8.23. 1	22.32.58	4
	♋	15. 7.38	22.46.	4

ORION'S RING, in astronomy, a constellation more usually called eridanus. See the article ERIDANUS.

ORIGANUM, *Origany*, or wild marjorum, in botany, a genus of plants, whose flowers are ringent, and collected in an imbricated spike; the tube of the corolla is cylindric and compressed; the upper lip is plane, obtuse, erect, and emarginated; and the lower one is trifid: it hath four stamina, two of which are longer than the others: there is no pericarpium, but the cup, which is connivent, contains four ovate seeds.

The common origany, which grows wild in many parts of England, is diaphoretic and diuretic, and may be used in the manner of tea in the asthma and a violent cough; the powder of the leaves and flowers, dried in the shade, is cephalic, and is a principal ingredient in the herb-snuff: it helps digestion, discusses wind, and is used externally in baths for the feet.

ORLE, ORLET, or ORLO, in architecture, a fillet under the ovolo or quarter-round of a capital. When it is at the top or bottom of the shaft, it is called cincture. See the article CINCTURE.

ORLE, in heraldry, an ordinary in form of a fillet draw round the shield, near the edge or extremity thereof, leaving the field vacant in the middle. Its breadth is but half that of the tressure or bordure, which contains a sixth part of the shield; and the orle, only a twelfth: besides that the orle is its own breadth distant from the edge of the shield, whereas the bordure comes to the edge itself. The form

form of the orle is the ſame with that of the ſhield, whence it reſembles an eſcutcheon.

ORNAMENTS, in architecture, are uſed to ſignify all the ſculpture or carved-work, wherewith a piece of architecture is enriched.

ORNITHOGALUM, ſtar of Bethlehem, in botany, a genus of plants, whoſe flower conſiſts of ſix petals of a lanceolated figure, from the baſe to the middle, erect, but ſpreading upwards, and perſiſtent; it hath ſix ſtamina, which are ſhorter than the corolla: the fruit is a roundiſh, angulated, triloculär capſule, formed of three valves, and contains a number of roundiſh ſeeds.

The roots of ornithogalum are of the bulbous kind, and are eaſily propagated by off-ſets, in July or Auguſt. This genus includes the ſtellaris of Dillenius.

ORNITHOLOGY, that branch of zoology which treats of birds. See BIRD.

Linnæus, whoſe ornithology we have chiefly followed, arranges the whole claſs of birds under ſix orders, according to the different figures of their beaks, viz.

1. The accipitres, or birds with uncinated or hooked beaks.

2. The picæ, or birds that have convex and compreſſed beaks.

3. The anſeres, comprehending ſuch birds as have depreſſed, and dentated, or ſerrated beaks.

4. The ſcolopaces, or thoſe furniſhed with ſubcylindric and obtuſe beaks.

5. The gallinæ, or birds which have the beak of a conic form, but crooked, and the upper chap imbricated.

6. The paſſeres, or birds with conic and ſharp-pointed beaks.

In the deſcription of birds, the feet, wings, and tail, are chiefly attended to.

In moſt birds the toes are four in number, three ſtanding forwards, and one backwards: in ſome, two toes ſtand forwards, and two backwards: ſome feet, again, are palmated, or have the toes connected together by a membrane; and others, ſemi-palmated.

With regard to the wings, the long quill-feathers, are called by authors remiges, as ſerving to fly with; and the other feathers, placed over the reſt of the body, tectrices. The long feathers of the tail are called rectrices, as ſerving to ſteer the bird's courſe through the air.

As to the other terms made uſe of in the deſcription of birds, they are theſe: cera expreſſes the membrane or naked tunic, which ſurrounds and extends itſelf over more or leſs of the baſe of the beak; urrhopigium is the rump; and as to other terms, they will be found explained under their ſeveral heads.

ORNITHOPODIUM, or ORNITHOPUS, bird's-foot, in botany, a genus of plants producing papilionaceous flowers; the vexillum is cordated and intire; the alæ are ovate and erect, and almoſt as large as the vexillum; the carina is very ſmall and compreſſed: the fruit is a taper ſubulated pod, with ſeveral articulations, and containing in each joint a ſingle roundiſh ſeed.

The leaves of a ſpecies of this genus, are ſaid to be good for an hernia, and for breaking and expelling the ſtone of the kidneys or bladder.

OROBANCHE, broom-rape, in botany, a genus of plants, the corolla of which is monopetalous and ringent; and its fruit is an oblong capſule formed of two valves, and containing a great many minute ſeeds.

The leaves of this plant, dried, and reduced to a powder, afford great relief in extreme pains of the cholic; and its ſyrup is recommended againſt the hypochondriac affection.

OROBANCHOIDES, a plant called by Linnæus monotropa. See the article MONOTROPA.

OROBUS, bitter-vetch, in botany, a genus of plants producing papilionaceous flowers; the vexillum is heart-ſhaped; the alæ are oblong and connivent; the carina is bifid and aſcendent: the fruit is a long taper pod, ending in a point, having one cell, which contains a number of roundiſh ſeeds.

It agrees in virtues with ervum. See the article ERVUM.

ORONTIUM, in botany, a genus of plants, whoſe flower-cup is a cylindric ſpadix; the corolla is formed of ſix peltated, roundiſh, perſiſtent petals, with ſix ſhort ſword-ſhaped filaments, topped with oblong twin antheræ: the fruit is a thin follicule, containing a fungous roundiſh ſeed.

ORPELLO, in the glaſs-trade, calcined glaſs reduced to a black powder.

ORPHAN, a fatherleſs child, or minor; or one that is deprived both of father and mother.

ORPIMENT, *Auripigmentum*, in natural hiſtory, a foſſile ſubſtance uſually found in copper-mines, compoſed of thin flakes, like the talcs; which eaſily ſplit, and are flexible, and not elaſtic, ſoluble in oil, fuſible in a moderate fire, and yielding in burning an offenſive ſmell like garlic.

It is an excellent depilatory mixed with lime, and made into a paſte with water; and the painters are fond of it as a gold-colour.

ORPINE, *Anacampſeros*, in botany, a plant whoſe root is perennial, compoſed of ſeveral white fleſhy tubercles, from which ariſe ſeveral upright, round, ſucculent ſtalks, about two feet high, branching out at the top; the leaves are fleſhy, oval, oblong, of a blueiſh-green colour, and ſerrated on their edges near the extremity: the flowers are placed on the top of the ſtalks in a corymbus, they are roſaceous, and are either of a white or purple colour: their form and generative parts are like thoſe of ſedum. See the article SEDUM.

Orpine is accounted vulnerary and aſtringent,

and is much recommended for its virtue in easing of pains; the leaves bruised and laid on the part, produce this effect, both in green-wounds and putrid ulcers; and if applied to corns, will in a short time take them away.

ORPINE *of Imperatus*. See the article TELEPHIUM.

Lesser ORPINE. See the article CRASSULA.

ORRACH, four kinds, in botany. See the articles ATRIPLEX, BLITUM, ATRAPHAXIS, and CHENOPODIUM.

ORRERY, a curious machine, or movement, for representing the motions and appearances of the heavenly bodies. See plate LXXII. *fig.* 5.

The orrery, or planetarium, is fixed in a frame of ebony, contained by twelve vertical planes, on which are represented the twelve signs of the zodiac. The upper surface is flat, of polished brass, on whose outward circumference are screwed in twelve brass pillars, which support a large flat silvered ring, marked 12, representing the ecliptic, with several circles drawn upon it. The three innermost are divided into twelve parts for the signs of the zodiac, each of which is divided into thirty degrees, and among these degrees are graved in their proper places, the nodes, aphelia, and greatest north and south latitudes of the planets. Between the next two circles are the cardinal points. The next three circles have the months and days of the month, according to the new stile. Upon the brass surface of the machine are graduated silver circles, which carry the planets (represented by silver balls) upon arbors or stems, that raise them up to the height of the plane of the ecliptic; and turning about the handle or winch of the orrery, all the planets move at their proportional distances from a little gilt ball in the middle, which represents the sun; and perform their revolutions according to their periodical times. There are fixed indices of blued steel, which shew the longitudes of the planets, by pointing to the divisions of the silvered rings or circles, as they move round. But as these circles, being concentric, give only the mean distances, the true orbits, according to their excentricities, are graved on the outside of each circle, with the periodical times taken from the tables, to shew what the revolutions are, nearer than can be performed by any machine. The nodes and aphelia, with the places of the greatest north and south latitudes, are also marked on those orbits.

In the middle of this large circle, designed to represent the ecliptic, is fixed a globe 1. to represent the sun; next the sun is a small ball, 2, to represent Mercury; next to this is Venus, represented by a larger ball, 3; and, at a greater distance from the sun, you see the earth, 4, represented by an ivory ball, surrounded, at some distance, by a ring, which expresses the orbit of the moon, making an angle with the circle that represents the ecliptic, and thereby shewing the inclination that they have to each other in the heavens, and also the line of the nodes. Within the same ring is another ivory ball, 5, with a black cap or case, to represent the moon; the cap is contrived always to cover that hemisphere, which is turned from the sun, and thereby distinguisheth the enlightened part from the dark side, and, consequently, her age: 6 represents Mars; 7 is Jupiter, attended with his satellites, or four moons; and 8, the outmost of all the planets, is Saturn, with his ring or belt, and five satellites or moons. All these are fixed upon small stems, which severally represent their axes, each of which hath its peculiar and proper inclination to the plane of that circle which represents the ecliptic. 9 is a dial-plate; 10, 10, 10, meridians; 11, the equator; 12, the ecliptic with its circles, already described; 13, 13, two keys, for locking and unlocking the diurnal and annual motions; and as to the arctic circle, tropic of cancer, and moveable horizon, they are named in the figure.

By means of the orrery, a great many persons, who have not time to apply themselves to the study of astronomy, and yet are desirous to be acquainted with the celestial appearances, in a few days may get a competent knowledge of several phænomina, and especially be cured of the common prejudices against the motion of the earth, and the copernican system. See the article COPERNICAN.

But the principal use of the orrery is to render the theory of the earth and the moon easy and intelligible; and to evidence to our senses how all these appearances happen, which depend on the annual or diurnal rotation of the earth, and the monthly revolutions of the moon: as the variety of seasons, the vicissitudes and various lengths of days and nights, the manner of solar and lunar eclipses, the various phases of the moon, &c.

There have been various forms invented for this noble instrument, two of which have principally obtained, viz. the hemispherical orrery, and the whole sphere: though the orrery at first was made without any sphere, with only the sun, the earth, and moon, revolving about it; but as this was too imperfect a state, they soon began to invest it, some with a half sphere, and others with a whole sphere, to be an adequate representation of the solar system.

The hemispherical orrery, as that just described, has been made in greater numbers than any other, on account of their being made much cheaper and easier than those in a sphere of the same size; there being a vast difference between placing an hemisphere on the box of an orrery, and disposing an orrery in a large moveable sphere. But the idea given us by the former, is very imperfect and unnatural in comparison of the latter, and it is surprising to think how they should have had so great a run!

An orrery, therefore, adapted to an armillary

Fig.1.

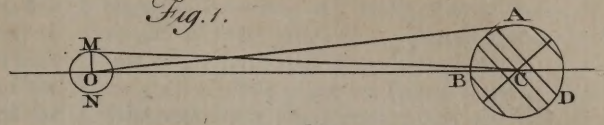


Fig.10. Parallax.

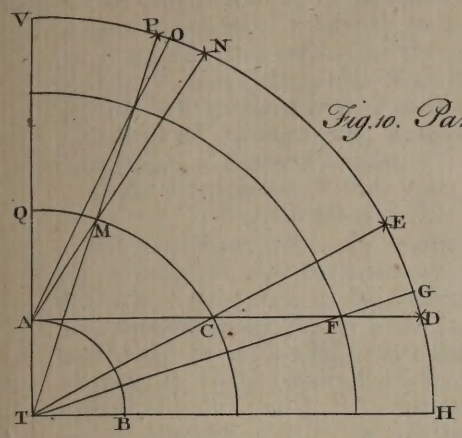


Fig.3.

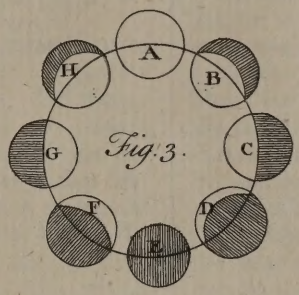


Fig.2.

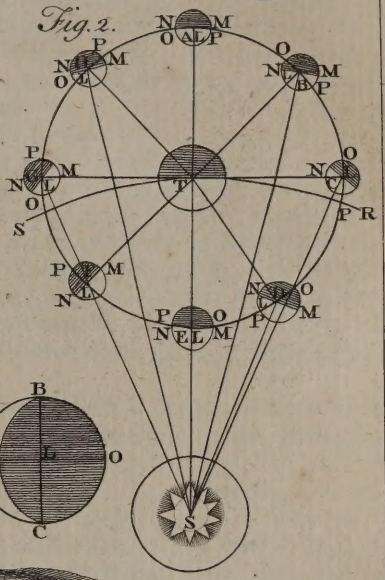


Fig.6. Orrery.

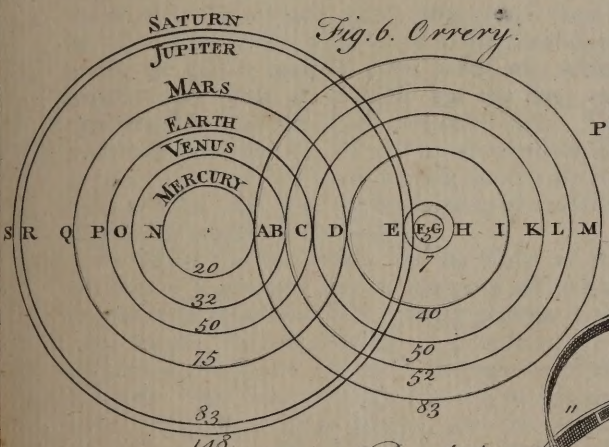


Fig.4.

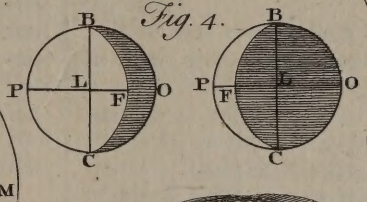


Fig.5. Orrery.

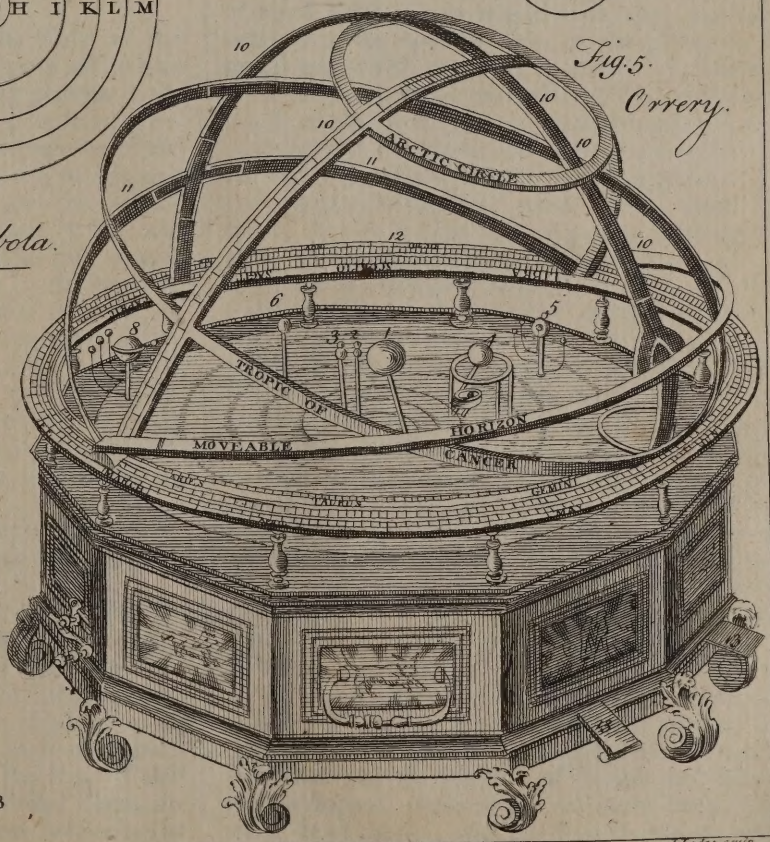


Fig.7. Parabola.

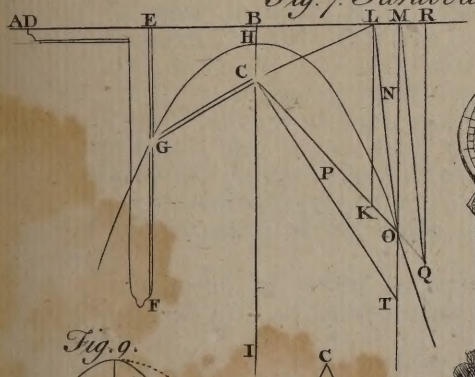
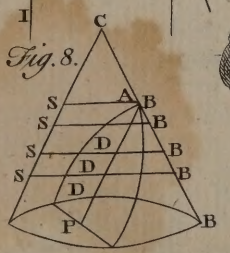


Fig.9.

Fig.8.



J. Nodar sculp.

ſphere, is the only machine that can exhibit a juſt idea of the true ſyſtem of the world, with the diurnal and annual motions of the heavenly bodies; but is likewiſe capable of exhibiting the third motion of the earth, viz. that motion of the earth by which the poles of the world revolve about the poles of the ecliptic, and occaſions what is commonly called the preceſſions of the equinoxes, or more properly the retrogreſſion of the earth's nodes.

As the diſtances are in their true proportions to each other, ſo likewiſe are the bodies of the planets in their juſt proportions to one another. But it cannot be expected, that the diameters of the planets ſhould be in proportion to the diameters of the orbits; becauſe taking Jupiter under three inches diameter, and the earth a little more than a quarter of an inch, it would require the ſyſtem to be of the bigneſs of a mile and $\frac{3}{4}$, the orbit of Saturn 9000 feet in diameter, and ſo on of the reſt; which would make the machine 3000 times greater than it is. And if the bodies were ſuited to the dimenſions given, the bodies muſt be 3000 times leſs, which would render them all inviſible but the ſun; and that would be leſs than $\frac{1}{100}$th part of an inch. For this reaſon, as a ball big enough to repreſent the ſun cannot be put on, we are to ſuppoſe the ſun (in reſpect of them) as big as the inner circle of the ſilver ring which repreſents the ecliptic.

As the orbit of the moon, and the orbits of the ſatellites of Jupiter and Saturn, are quite loſt in this proportion of the orbits of the primary planets, much more are the ſatellites themſelves; therefore the ſatellites are uſually not put on in this poſition of the machine. But Saturn's ring is joined to Saturn's body, according to its proportion, and the inclination of its plane to the plane of Saturn's orbit: and as the planet is carried round, the ring always moves parallel to itſelf, as it does in the heavens. Thereby we ſee why the inhabitants of the earth, in one revolution of Saturn, ſee the ring twice in the moſt open ſituation of the anſæ, as at 8, and twice, as if it had no ring, that is, when the edge of the ring is towards the earth (the plane of the ring going through the obſerver's eye) and the ſucceſſive increaſing and decreaſing of the viſible bigneſs of the anſæ.

Jupiter, with his moons, is repreſented at 7, and the ſpots whereby his revolution has been obſerved.

When you have a complete idea of the proportional bigneſs of the planets, Jupiter and Saturn are taken off, and others put on three times leſs than the former, in order to put ſatellites about them, (and at the ſame time the moon is joined to the earth) and ſhew how the ſatellites accompany their primary planet in its courſe round the ſun. Theſe ſatellites which are pearls upon crooked ſtems, do not turn by clock-work round their primaries (as has been done in ſome large orreries) but are only ſet by the hand; becauſe, to do it, would be only a needleſs expence, to give a falſe notion of their bigneſs, diſtances, and inclination of their orbits, in reſpect of their primaries. But to give a right notion of Jupiter's and Saturn's ſatellites, there is ſhewn for each of theſe planets a ſyſtem a-part, where the ſtiſtances from the primary, and the bigneſs of the ſatellites, are expreſſed; and in this ſyſtem, though Jupiter is but of about an inch diameter, the outermoſt ſatellite is as far diſtant from Jupiter's center, as Saturn is from the ſun in the machine; which ſhews the inconſiſtency and diſproportion of making the ſatellites to move round Jupiter in an orrery. Saturn's ſatellites are ſtill more improperly put in; becauſe four of them move in orbits very much inclined to Saturn's ecliptic (viz. in an angle of above thirty degrees) and the fifth has its orbit almoſt in the ſame plane as Saturn's ecliptic, with a diameter greater than the diameter of the whole orrery, even when Saturn is three times leſs than the Saturn of the orrery.

The next thing which is put on, is a contrivance to ſhew, that all the confuſion of the planets-motions in the Ptolemaic hypotheſis (called their ſtations and retrogradations) is not really, but apparently ſo, in the Capernican or true ſyſtem of the world. And this is done by two ſteel indices, one of which being always applied to the ſun, and ſucceſſively to the top of the ſtem of the planet to be examined, whilſt the other is applied to the earth (as a center) and the ſaid planet: by turning the handle of the machine, the heliocentric and geocentric places of the planet are ſeen on the ecliptic at the ſame time; ſhewing why the planets ſeem to go backwards and forwards when viewed from the earth; they go all the while regularly from eaſt to weſt, as they would be ſeen from the ſun.

When the machine is put in motion, all theſe bodies move round that which repreſents the ſun, and, at the ſame time, both that, and all thoſe which repreſent ſuch of the planets as have been obſerved to have a rotation round their axis, turn round upon the ſaid ſtems, and in their proper times. The ſatellites, or moons, alſo revolve about their primaries at the ſame time; and the ring that repreſents the orbit of the moon has likewiſe its proper motion, whereby that of its nodes is alſo expreſſed. The whole machine is put into motion by turning a ſmall winch, 14, like the key of a clock, with very little ſtrength. And, above this winch, is a cylindrical pin, which may be drawn a little out, or puſhed in at pleaſure: when it is puſhed in, all the planets, both primary and ſecondary, will move according to their reſpective periods, by turning the handle or winch: when it is drawn out, the motions of the ſatellites of Jupiter and Saturn will be ſtopped, while all the reſt move freely. In the place of the ſun, you may fix a braſs lamp, with two convex glaſſes, made on purpoſe; which, being

ing placed with the glaſs directly to the earth, and turning round in the ſame time with the earth, throws a continual ſtrong light upon it and the moon, in whatever part of its orbit it is; and ſo not only the times in which the eclipſes of the ſun and moon will happen, are ſhewn, but the phænomena themſelves are truly repreſented.

When you propoſe to uſe this machine, place a ſmall black patch, or a bit of wafer, upon the middle of the ſun, right againſt the firſt degree of ♈: you may alſo place patches upon Venus, Mars, and Jupiter, right againſt ſome noted point in the ecliptic; put on the handle, and puſh in the pin which is juſt above it. One turn of this handle anſwers to a revolution of the ball, which repreſents the earth, about its axis; and, conſequently, to 24 hours of time, as may be ſeen by the motion of the hour index, 9, which is marked, and placed at the foot of the wire, on which the ball of the earth is fixed: again, when the index has moved the ſpace of ten hours, Jupiter makes one complete revolution round its axis; and ſo of the reſt.

By theſe means the revolutions of the planets, and their motions round their own axes, will be repreſented to the eye. And it is worth obſervation, that the diurnal motion of the planets was diſcovered, by obſerving the motions of the ſpots upon the ſurface of the ſun, and of the planets in the heavens, after the ſame manner as we here obſerve the motions of their repreſentatives, by that of the marks placed upon them in this machine.

This machine is ſo contrived, that the winch may be turned either way; ſo that, the ſame number of revolutions being made backwards, they will bring all the planets to their former aſpects or ſituations in reſpect to each other.

It would be too great an undertaking here to give an account of the mechaniſm of the larger ſort of orreries, which repreſented the movements of all the heavenly bodies; nor, indeed, can it be done either by diagram or diſcription, to render it intelligible to the moſt diſcerning reader; but, inſtead of that, we ſhall exhibit an idea of the theory and ſtructure of an uſeful, conciſe, and portable planetarium, which any gentleman may have made for a ſmall expence, and will exhibit, very juſtly, the motions of all the primary planets about the ſun, by wheel-work; and thoſe that have ſecondaries, or moons, may have them placed about their primaries moveable by the hand, ſo that the whole ſhall be a juſt repreſentation of the ſolar ſyſtem, or true ſtate of the heavens, for any given time of the year.

In order to this we muſt compare, and find out the proportion, which the periodical times, or revolutions of the primary planets, bear to that of the earth; and they are ſuch as are expreſſed in the table below, where the firſt column is the time of the earth's period in days and decimal parts; the ſecond that of the planets; the third and fourth are numbers in the ſame proportion to each other: as,

365,25 : 88	☿ ::	83 :	20, for Mercury.
365,25 : 224,7	♀ ::	52 :	32, for Venus.
365,25 : 686,9	♂ ::	40 :	74, for Mars.
365,25 : 4332,5	♃ ::	7 :	83, for Jupiter.
365,25 : 10759,3	♄ ::	5 :	148, for Saturn.

If we now ſuppoſe a ſpindle or arbor with ſix wheels fixed upon it in an horizontal poſition, having the number of teeth in each, correſponding to the numbers in the third column, viz. the wheel A M (*fig.* 6.) of 83 teeth, B L of 52, C K of 50, (for the earth), D I of 40, E H of 7, and F G of 5; and another ſet of wheels moving freely about an arbor, having the number of teeth in the fourth column, viz. A N of 20, B O of 32, C P of 50, (for the earth), D Q of 75, E R of 83, and F S of 148; then if theſe two arbors of fixed and moveable wheels are made of the ſize, and fixed at the diſtance from each other, as here repreſented in the ſcheme, the teeth of the former will take thoſe of the latter, and turn them very freely, when the machine is in motion.

Theſe arbors, with their wheels, are to be placed in a box, of an adequate ſize, in a perpendicular poſition: the arbor of fixed wheels to move in pivots at the top and bottom of the box; and the arbor of moveable wheels to go through the top of the box, to a proper height, on the top of which is to be placed a round ball, gilt with gold, to repreſent the ſun. On each of the moveable wheels is to be fixed a ſocket, or tube, aſcending above the top of the box, and having on the top a wire fixed, and bent at a proper diſtance into a right angle upwards, bearing on the top a ſmall round ball, repreſenting its proper planets.

If then on the lower part of the arbor of fixed wheels be placed a pinion of ſcrew-teeth, a winch turning a ſpindle with an endleſs ſcrew, playing in the teeth of the arbor, will turn it with all its wheels; and thoſe wheels will move the others about with their planets, in their proper and reſpective periods of time, very exactly. For, while the fixed wheel C K moves its equal C P once round, the wheel A M will move A N a little more than four times round, and ſo will nicely exhibit the motion of Mercury; and the wheel F G will turn the wheel F S about $\frac{1}{29,5}$ round, and ſo will truly repreſent the motion of Saturn; and the ſame is to be obſerved of all the reſt.

ORRICE, the iris-root. See the article IRIS.

ORTEGIA, in botany, a genus of plants, whoſe flower is apetalous; it conſiſts of a pentaphyllous upright cup, which is premanent, with three ſubulated filaments, topped with linear, compreſſed

preſſed antheræ. The fruit is a three-cornered, ovate, unilocular capſule, containing a great number of very minute ſeeds.

ORTEIL, in fortification, the ſame with berme. See the article BERME.

ORTHODOX, in church-hiſtory, an appellation given to thoſe who are found in all the articles of the Chriſtian faith.

ORTHOGONAL, in geometry, the ſame with rectangular.

ORTHOGRAPHIC *Projection of the Sphere*, that wherein the eye is ſuppoſed at an infinite diſtance; ſo called becauſe the perpendiculars from any point of the ſphere, will all fall in the common interſection of the ſphere with the plane of the projection. See PROJECTION and MAP.

ORTHOGRAPHY, that part of grammar, which teaches the nature and affections of letters, and the juſt method of ſpelling or writing words with all the proper and neceſſary letters, making one of the four greateſt diviſions or branches of grammar.

ORTHOGRAPHY, in geometry, the art of drawing or delineating the fore-right plan of any object, and of expreſſing the heights or elevations of each part. It is called orthography, from its determining things by perpendicular lines falling on the geometrical plane.

ORTHOGRAPHY, in architecture, the elevation of a building.

This orthography is either external or internal. The external orthography is taken for the delineation of an external face or front of a building; or, as it is by others defined, the model, platform, and delineation of the front of a houſe, that is contrived, and to be built, by the rules of geometry, according to which pattern the whole fabric is erected and finiſhed. This delineation or platform exhibits the principal wall, with its apertures, roof, ornaments, and every thing viſible to an eye placed before the building. Internal orthography, which is alſo called a ſection, is a delineation or draught of a building, ſuch as it would appear were the external wall removed.

ORTHOGRAPHY, in perſpective, is the fore-right ſide of any plane, i. e. the ſide or plane that lies parallel to a ſtraight line, that may be imagined to paſs through the outward convex points of the eyes, continued to a convenient length.

Lamy, and others, uſe the word ſcenography in the ſame ſenſe.

ORTHOGRAPHY, in fortification, is the profile or repreſentation of a work; or a draught ſo conducted, as that the length, breadth, height, and thickneſs of the ſeveral parts are expreſſed, ſuch as they would appear if perpendicularly cut from top to bottom. See FORTIFICATION.

ORTHOPNOEA, in medicine, a ſpecies or degree of aſthma, where there is ſuch a difficulty of reſpiration, that the patient is obliged to ſit or ſtand upright, to be able to breathe. See the article ASTHMA.

ORTIVE, in aſtronomy, the ſame with eaſtern: the ortive or eaſtern amplitude, is an arch of the horizon intercepted between where a ſtar riſes, and the eaſt point of the horizon, or point where the horizon and equator interſect.

ORVALA, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is the length of the cup; the upper lip is oblong, fornicated, and dentated on the top, and the lower one is cut into three ſegments: there is no pericarpium, but the cup contains four reniform ſeeds.

ORYZA, rice, in botany, a genus of plants, of which there is but one known ſpecies: it hath a root like that of wheat; the ſtalks are furrowed, riſing to two or three feet high, and jointed; the leaves are lanceolated and fleſhy; the flowers grow on the tops of the ſtalks in panicles, they are of a purple colour, and are each formed of a bivalvular glume, with two obtuſe premanent valves for its corolla; the nectarium is compoſed of two leaves, plane, very ſmall, and placed on the ſide of the germen; there is no pericarpium; the corolla grows to the ſeed, which is large, oblong, and compreſſed.

This plant is much cultivated in hot countries, in moiſt, marſhy land, and is uſed inſtead of bread in moſt of the eaſtern countries, where it is the principal food. It is now planted in great abundance in Carolina, and is as good as in any other part of the world. It is chiefly uſed here for puddings, and to make rice-milk.

OSCILLATION, in mechanics, the vibration, or reciprocal aſcent and deſcent of a pendulum. See PENDULUM.

OSIER, in botany, a ſpecies of the ſalix or willow, much cultivated in moiſt places, called oſier-grounds, for the uſe of baſket-makers; no plant being more pliant for their purpoſe: they are propagated by cuttings, and are annually cut down, and always kept low: the ſeaſon for planting the cuttings is in February, and for cutting the twigs in winter.

OSMITES, in botany, a genus of plants, producing compound and radiated flowers: the flowers which compoſe the diſc are hermaphrodite, tubuloſe, and quinquifid; the female flowers which form the rays, are lanceolated and intire; it hath no pericarpium, but the cup, which is immutable, contains ſolitary oblong ſeeds with very little down.

OSMUNDA, flowering fern, in botany, a genus of the cryptogamia claſs of plants; it produces on the top of the leaves a globoſe capſule, diſpoſed in a racemus, and opens horizontally: the ſeeds are numerous, very ſmall, and of an oval figure: It grows in moiſt places in ſeveral parts of England; the root is the only part uſed in medicine, and is ſaid to be detergent and ſub-aſtringent.

OSSICLE, *officulum*, a little bone, a diminutive of bone, in which ſenſe it is frequently uſed by anatomiſts.

Botaniſts alſo uſe officulum for the ſtone of a plumb, cherry, or any other ſtone-fruit.

OSSIFICATION, the formation of bones, but more particularly the converſion of parts naturally ſoft, to the hardneſs and conſiſtence of bones.

OSTEOCOPOS, in medicine, any pain in the bones, whether ariſing from wearineſs, a ſharp ſcorbutic humour, or a venereal taint. See the article PAIN.

OSTEOSPERMUM, in botany, a genus of plants, producing compound, radiated flowers; the corollulæ, which form the diſc, are hermaphrodite, tubuloſe, and quinquedented: the female florets, which compoſe the rays, are linear, ligulated, and tridentated; the hermaphrodite flowers are barren, the ſeeds are hard, globoſe and ſolitary, and placed in the cup.

OSTIA, in anatomy, an appellation given to the orifices or apertures of the veſſels of the body.

OSTRACISM, *οστρακισμος*, in Grecian antiquity, denotes the baniſhment of ſuch perſons whoſe merit and influence gave umbrage to the people of Athens, leſt they ſhould attempt any thing againſt the public liberty. It was ſo called, becauſe the people voted a perſon's baniſhment, by writing his name on ſhells, called in greek *οστρακον*, and caſting them into an urn.

OSTREA, the oyſter. See the article OYSTER.

OSTRICH, *Struthio*, in ornithology, a diſtinct genus of birds, of the order of the gallinæ: it has only two toes to each foot, and theſe are both placed forward; and its head is ſimple, or not ornamented with the appendages which are common to moſt birds of this order.

The oſtrich is the talleſt of all the bird kind, meaſuring ſeven or eight feet when it ſtands ereſt: its legs are very long and naked; and the ſtructure of the foot, having only two toes, is particular.

OSYRIS, poet's roſemary, in botany, a genus of plants, producing male and female apetalous flowers on different plants. The fruit is an umbilicated, globoſe berry, with one cell, containing an oſſeous round ſeed.

OTHONNA, African ragwort, in botany, a genus of plants, producing compound, radiated flowers: the hermaphrodite florets, which compoſe the diſc, are tubulous and quinquedentated; the female corollulæ, which form the rays, are lanceolate, ligulate, indented at the extremity in three parts, which are reflexed. The ſeeds, which are ſolitary and oblong, are contained in the cup, and are either naked, or crowned with down.

OTIS, the buſtard, in ornithology, makes a diſtinct genus of birds, of the order of the gallinæ, the characters of which are theſe: there are three toes on each foot, all turned forewards; and the head is naked, or has no comb.

The buſtard has been confounded with the turkey: it is about the ſize of the common peacock, and runs at a prodigious rate, being frequently taken with greyhounds in a fair courſe, in the manner of hunting the hare: its fleſh is well taſted.

OTTER, *Lutra*, in zoology, a genus of quadrupeds, of the order of the feræ, the characters of which are theſe: the foreteeth of the upper-jaw are ſtraight, diſtinct, and acute; thoſe of the under jaw are obtuſe, and ſtand cloſe together. the ears are ſituated lower than the eyes, and the feet are furniſhed each with five toes, and are palmated or formed for ſwimming.

Of this genus there are are two ſpecies: 1. The common otter, with all the toes of an equal length: this is a very fierce animal, three feet in length, including the tail. 2. The Braſilian otter, with the inner toe ſhorter than all the reſt. This is ſomewhat larger than the former ſpecies.

OVAL, an oblong, curvilinear figure, otherwiſe called ellipſis. See ELLIPSIS. However, the proper oval, or egg-ſhape, differs conſiderably from that of the ellipſis, being an irregular figure, narrower at one end that at the other: whereas the ellipſis, or mathematical oval, is equally broad at each end: though, it muſt be owned, theſe two are commonly confounded together; even geometricians calling the oval a falſe ellipſis.

OVARIES, in anatomy, called, by the earlier writers, teſtes muliebres, are two bodies of nearly an oval figure; but gibbous on the upper ſurface, and flat below: they are of a whitiſh colour and ſmooth ſurface, and are annexed, one on each ſide, to the fundus of the womb.

OVATION, in the Roman antiquity, a leſſer triumph, allowed to commanders for victories won without the effuſion of much blood; or, for defeating a mean and inconſiderable enemy. The ſhow generally began at the Albanian mountain, whence the general, with his retinue, made his entry into the city on foot, with many flutes or pipes ſounding in concert as he paſſed along, and wearing a garland of myrtle as a token of peace. The term ovation, according to Servius, is derived from *ovis*, ſheep, becauſe on this occaſion the conqueror ſacrificed a ſheep, as in a triumph he ſacrificed a bull.

OVEN, a kind of domeſtic furnace, uſed for baking bread, pies, tarts, &c. of a circular ſtructure, with a very low roof, well lined, both on the top, bottom, and ſides, with ſtone; it has a ſmall entrance in the front, which is exactly fitted by a kind of door, which being clapped to the mouth of the oven, confines the heat, while bread, pies, or puddings are baking. Over this, paſtry-cooks, &c. have another oven built much in the ſame manner, which

which is used for such things as require a less degree of heat.

Assaying OVEN, in metallurgy, a particular kind of furnace, used by assayers in their operations upon metals.

OVER, in general, signifies one thing being above another; through, or from, one end to another; beyond, cross, or overthwart; it also denotes excess, &c. thus,

OVER-BLOW, among seamen, is when the winds blow so very hard, that the ship can bear no topsails.

OVER-DONE, in the manege: a horse is said to be over-done when his wind and strength are broke and exhausted with fatigue.

OVER-FLOWING *of Lands*, among husbandmen, is commonly effected by diverting the streams of rivers, brooks, land-floods, or springs, or some part of them, out of their natural channel; but where streams lie too low for this, they are made use of to turn such engines as may raise a quantity of water to do it. The most useful engine for this purpose is the Persian wheel. See the article PERSIAN WHEEL.

OVER-HALE, in the sea-language. A rope is said to be over-haled, when drawn too stiff, or haled the contrary way.

OVER-RULING *an Objection*, in law, is the rejecting it, or setting it aside by the court.

OVER-RUNNING, among printers. See the article PRINTING.

OVERSEERS *of the Poor*, are public officers appointed by statute in every parish, to provide for the poor therein; and sometimes there are two, three, or four, according to the largeness of parishes.

OVERSET, or OVERTHROW, in the sea-language. A ship is said to overset, when her keel turns uppermost; which misfortune is occasioned either by bearing too much sail, or by grounding her so that she falls upon one side.

OVERT, the same with open: thus an overt-act signifies an act which, in law, must be clearly proved; and such is to be alledged in every indictment for high treason.

OVERTURE, or OUVERTURE, opening or preluding; a term used for the solemnities at the beginning of a public act or ceremony; an opera, tragedy, concert of music, &c.

The overture of the theatre, or scene, is a piece of music usually ending with a fugue; the overture of a jubilee is a general procession, &c.

OVIEDA, in botany, a genus of plants, the corolla whereof is a ringent single petal; the tube of the corolla is very long and small; the upper-lip is concave and emarginated; the lower one is divided into three equal segments. The fruit is a globose berry, containing two roundish seeds.

OVIPAROUS, a term applied to such animals as bring forth their young, *ab ovo*, from eggs; as birds, insects, &c. See the article EGG.

OVIS, the sheep, in zoology. See the article SHEEP.

OUNCE, *Uncia*, a little weight, the sixteenth part of a pound-avoirdupois, and the twelfth part of a pound-troy: the ounce-avoirdupois is divided into eight drams, and the ounce-troy into twenty penny-weights. See WEIGHT.

OVOLO, or OVUM, in architecture, a round moulding, whose profile, or sweep, in the Ionic and Composite capitals, is usually a quadrant of a circle: whence it is also commonly called the quarter-round. It was usually enriched with sculpture by the ancients, in the form of chesnut-shells; whence Vitruvius, and others, called it echinus, i. e. chesnut-shell. See the article MOULDING.

Among us, it is usually cut with the representation of eggs and anchors, or arrow-heads placed alternately.

OUT-HOUSES are such as belong and are adjoining to dwelling-houses.

OUT-LAND, among the Saxons, was that land that lay beyond the demesnes, and was granted out to tenants; though at the will of the lord, in like manner as copyhold estates.

OUT-LAW, signifies one that is deprived of the benefit of the law, and therefore held to be out of the king's protection.

OUTLAWRY, is where a person is outlawed, and on that account loses the benefit of a subject.

OUTLICKER, in a ship, a small piece of timber made fast to the top of the poop, and standing out right a-stern. At the outmost end thereof is a hole, into which the standing part of the sheet is reeved, through the block of the sheet; and then again through another block, which is seized close by the end of this outlicker. It is seldom used in great ships, except the mizen-mast is placed so far aft, that there is not room within-board to hale the sheet flat.

OUTWARD *Flanking-Angle*, or *The Angle of the Tenaille*, in fortification, is comprehended by the two flanking lines of defence. See the article TENAILLE.

OUTWORKS, in fortification, all those works made without-side the ditch of a fortified place, to cover and defend it.

Outworks, called also advanced and detached works, are those which not only serve to cover the body of the place, but also to keep the enemy at a distance, and prevent his taking advantage of the cavities and elevations usually found in the places about the counterscarp, which might serve them either as lodgments, or as rideaux, to facilitate the carrying on their trenches, and planting their batteries against the place; such are ravelines, tenailles, horn-

horn-works, queve d'arondes, envelopes, crown-works, &c. See the articles RAVELINE, TENAILLE, &c.

OWLER, any perſon who conveys wool, &c. to the ſea-ſide in the night-time, there to be ſhipped, contrary to law.

OWSE, among tanners, oaken bark beaten or ground ſmall, to ſerve in the preparation of leather.

OX, *Bos*, in zoology, makes a genus of quadrupeds. See the article BOS.

OXALIS, wood-ſorrel, in botany, a genus of plants, whoſe flower is monopetalous, and deeply cut into five obtuſe emarginated ſegments, cohering together by their ungues; the ſtamina are ten capillary erect filaments, topped with roundiſh furrowed antheræ. The fruit is a pentagonal capſule, with five cells, containing roundiſh ſeeds, which fly out with an elaſticity when ripe.

OX-EYE, buphthalmum, in botany. See the article BUPHTHALMUM.

OXGANG, or OXGATE, is generally taken, in our old law-books, for fifteen acres, or as much ground as a ſingle ox can plough in a year.

OXICOCCUS, in botany, a ſpecies of vaccinium. See VACCINIUM.

OXYCRATE, *Oxycratum*, in pharmacy, &c. a mixture of vinegar and water, proper to aſſwage, cool, and refreſh: they make fomentations of oxycrate, clyſters of oxycrate, &c. The uſual proportion is one ſpoonful of vinegar to five or ſix ſpoonfuls of water.

OXYCROCEUM, in pharmacy, &c. a preparation much uſed in plaſters for fractures, &c. made as follows: take yellow wax, one pound; pitch and galbanum, each half a pound: melt them over a gentle fire; and then add of Venice-turpentine, myrrh, and olibanum, each three ounces; ſaffron, two ounces: make them into a plaſter.

OXYMEL, in pharmacy, a compoſition of vinegar and honey.

There are ſeveral ſorts of oxymel, whereof the ſimple kind is made by boiling, in a glazed earthen-veſſel, and with a gentle fire, two pounds of clarified honey, in a pint of vinegar, to the conſiſtence of a ſyrup.

The chief compound oxymels, are oxymel of of garlic, and oxymel of ſquills.

Oxymel of garlic is made thus: take of garlic, ſliced, an ounce and an half; caraway-ſeeds, and ſweet-fennel-ſeeds, of each two drams; of clarified honey, ten ounces; of vinegar, half a pint; boil the vinegar a little while in a glazed earthen veſſel, with the ſeeds bruiſed; then add the garlic, and cover the veſſel: after all is cold, preſs out the liquor; and, with the heat of a balneum, diſſolve in it the honey.

Oxymel of ſquills is made by boiling three pounds of clarified honey in a quart of vinegar of ſquills, over a gentle fire, to the conſiſtence of a ſyrup.

In all the oxymels, a metalline veſſel muſt be avoided, leſt it ſhould be corroded by the vinegar.

OYER, in law-books, ſeems to have been antiently uſed for what is now called aſſiſes. See the article ASSISE.

OYER *and Terminer*, a commiſſion directed to the judge of aſſiſe, and other gentlemen, impowering them to hear and determine all criminal cauſes, and to try all offenders, whether for treaſon, felony, or treſpaſs.

OYER *of a Deed*, a petition to hear and peruſe any deed, upon which an action is brought.

OYES, or OYEZ, ſignifies *hear ye*; and is frequently uſed by the cryers in our courts, on making proclamation, or to enjoin ſilence.

OYSTER, or OISTER, *Oſtrea*, in ichthyology, a genus of bivalve ſhell-fiſh, the lower valve of which is hollowed on the inſide, and gibboſe without; the upper one is more flat; and both are compoſed of a multitude of laminæ or cruſts, and uſually ſcabrous or rough on the outer ſurface: ſome oyſter-ſhells are alſo furniſhed with tubercles or ſpines, and others are deeply furrowed and plicated: the figure of moſt is roundiſh, but in ſome it is quite irregular.

Oyſter-ſhells are accounted drying and abſtergent, and, given internally, ſudorific.

P.

PAC

P The fifteenth letter, and eleventh conſonant of our alphabet; the ſound of which is formed by expreſſing the breath ſomewhat more ſuddenly than in forming the ſound of b: in other reſpects, theſe two ſounds are very much alike, and are often confounded one with another.

When *p* ſtands before *t* or *ſ*, its ſound is loſt, as in the words *pſalms*, *pſychology*, *ptolemaic*, *ptiſan*, &c. when placed before *h*, they both together have the ſound of *f*, as in *philoſophy*, *phyſic*, &c.

As an abbreviature, P. ſtands for publius, pondo, &c. PA. DIG. for patricia dignitas; P. C. for patres conſcripti; P. F. for publii filius; P. P. for propoſitum, or propoſitum publice; P. R. for populus Romanus; PR. S. for prætoris ſententia; and PRS. P. for præſes provinciæ.

In the Italian muſic, P. ſtands for piano, or ſoftly; PP. for piu piano, or more ſoftly; and PPP. for pianiſſimo, or very ſoftly.

Among aſtronomers, P. M. is uſed to denote poſt meridiem, or afternoon; and ſometimes for poſt mane, or after midnight.

As a numeral, P. ſignifies the ſame as $\overline{C}$, viz. 400; and with a daſh over it, thus $\overline{P}$, 400,000.

Among phyſicians, P. denotes pugil, or the eighth part of a handful; P. Æ. partes æquales, or equal parts of the ingredients; P. P. ſignifies pulvis Patrum, or the Jeſuits-powder; and ppt. præparatus, prepared.

PABULUM, fuel, among natural philoſophers and chemiſts. See the articles FUEL and FIRE.

PACE, *Paſſus*, a meaſure taken from the ſpace between the two feet of a man, in walking; uſually reckoned two feet and a half, and in ſome men, a yard, or three feet. See MEASURE.

The geometrical pace is five feet; and 60000 ſuch paces make one degree of the equator. See DEGREE.

PACK, in commerce, denotes a quantity of goods, made up in loads, or bales, for carriage.

PÆD

A pack of wool is ſeventeen ſtone and two pounds, or a horſe's load.

PACKAGE, is a ſmall duty of one penny in the pound, paid for all goods not particularly rated.

PACKERS, perſons whoſe employment it is to pack up all goods intended for exportation; which they do for the great trading companies and merchants of London, and are anſwerable if the goods receive any damage through bad packing.

PACT, or PACTION, *Pactum*, in law, denotes a contract or agreement between two or more parties. See CONTRACT.

PACTA CONVENTA, in Poland, are the articles agreed on between the king and the republic, which they mutually oblige each other to obſerve.

PADDLE, in glaſs-making, an inſtrument with which the workmen ſtir about the ſand and aſhes in the calcar. See the articles CALCAR and GLASS.

PADDOC, or PADDOC-COURSE, a piece of ground encompaſſed with pales or a wall, and taken out of a park for exhibiting races with grey-hounds, for plates, wagers, or the like.

PADUS, the bird-cherry, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh, concave, patent petals, inſerted by their ungues into the edge of the calyx: the fruit is a roundiſh drupe, incloſing an oval acuminated nut, with rough furrows.

Of this genus, the laurel is a ſpecies. See the article LAUREL.

The fruit of this plant is recommended to be hung about the neck of children ſubject to epilepſies. It is of an emollient and heating nature.

PÆAN, among the ancient pagans, was a ſong of rejoicing ſung in honour of Apollo, chiefly uſed on occaſions of victory and triumph.

PÆDEROTA, in botany, a genus of plants, whoſe flower is monopetalous, ſubrotated, quadrifid, and obtuſe: the ſtamina are two ſlender filaments, topped with connivent antheræ: the fruit is

an ovate capſule, with two cells, opening at the top, and contains a number of roundiſh ſeeds.

PÆDO-BAPTISM, infant-baptiſm, or that conferred on children. See BAPTISM.

PÆONIA, piony, in botany, a genus of plants, whoſe flower conſiſts of five large, roundiſh, concave petals, which ſpread open, and are narrow towards the baſe: the filaments are numerous, and topped with oblong quadrangular antheræ: the fruit conſiſts of two oblong, reflexed, hairy capſules, each containing a ſingle cell and one valve, opening longitudinally inwards: the ſeeds are numerous, oval, ſmooth, ſhining, and coloured: the number of the germina (though naturally two) varies greatly, for in ſome flowers there are five, but there are always the ſame number of capſules as germina.

The double flowering piony, is kept in our gardens, for the beauty of its large red flowers; they are eaſily propagated by parting their roots, in Auguſt or September, and are extremely hardy, for they will grow in any ſoil or ſituation.

A ſpecies, called the male piony, is principally uſed in medicine, and is ſaid to be a ſpecific againſt the falling-ſickneſs, convulſions, and the palſy.

PAGAN, *Paganus*, a heathen, gentile, or idolator; one who adores falſe gods. See the article PAGANISM.

PAGANALIA, certain feſtivals obſerved by the ancient Romans, in the month of January.

They were inſtituted by Servius Tullius, who appointed a certain number of villages (pagi) in each of which an altar was to be raiſed for annual ſacrifices to their tutelar gods; at which all the inhabitants were to aſſiſt, and give preſents in money, according to their ſex and age, by which means the number of country-people was known.

The ſervants upon this occaſion offered cakes to Ceres and Tellus, to obtain plentiful harveſts.

PAGANISM, the religious worſhip and diſcipline of Pagans, or the adoration of idols and falſe gods. See IDOLATRY.

The gods of paganiſm were either men, as Jupiter, Hercules, Bacchus, &c. or fictitious perſons, as Victory, Fame, Fever, &c. or beaſts, as in Egypt, Crocodiles, Cats, &c. or, finally, inanimate things, as Onions, Fire, Water, &c.

PAGE, a youth of ſtate retained in the family of a prince or great perſonage, as an honourable ſervant, to attend in viſits of ceremony, do meſſages, bear up trains, robes, &c, and at the ſame time to have a genteel education, and learn his exerciſes.

The pages in the king's houſhold are various, and have various offices aſſigned them, as pages of honour, pages of the preſence-chamber, pages of the back ſtairs, &c.

This word is uſed in the Turkiſh ſeraglio for the children of tribute, or ſlaves who wait on the grand ſeignior: they are commanded by the chief aga, and conſtitute four claſſes, called oda's.

PAGEANT, a triumphal car, chariot, arch, or other like pompous decoration, variouſly adorned with colours, flags, &c. carried about in public ſhews, proceſſions, &c.

PAGOD, or PAGODA, a name whereby the Eaſt-Indians call their temple in which they worſhip their gods.

PAGOD, or PAGODA, is alſo the name of a gold and ſilver coin, current in ſeveral parts of the Eaſt-Indies.

PAIN, *Dolor*, is defined to be an uneaſy ſenſation, ariſing from a ſudden and violent ſolution of the continuity, or ſome other accident, in the nerves, membranes, muſcles, veſſels, &c. of the body; or, according to ſome, it conſiſts in a motion in the organs of ſenſe; and according to others, it is an emotion of the ſoul occaſioned by theſe organs.

PAINTED-LADY, pink, in botany. See the article PINK.

PAINTED LADY, pea, in botany. See the article LATHYRUS.

PAINTING, the art of repreſenting natural bodies, and giving them an appearance of life, by the turn of lines, and the degrees of colours.

Whoever would apply himſelf to painting, ſays that celebrated Italian painter Leonardo da Vinci, muſt in the firſt place learn perſpective; this will enable him to diſpoſe things in their proper places, and to give the due dimenſions to each: having done this, he muſt learn to deſign; chooſing for that purpoſe ſome able maſter, who at the ſame time may give him ſome inſight into the colours of figures: he ought then to conſult nature, to confirm himſelf in what he has already learnt, and, laſtly, let him apply himſelf to the ſtudy and imitation of the greateſt maſters, in order to get a habit of reducing what he has learnt into practice. See the articles DRAWING, DESIGN, PERSPECTIVE, &c.

For the different methods of painting, ſee the articles ENAMEL, FRESCO, GLASS, LIMNING, MINIATURE, &c.

PAIR, *Par*, denotes two equal and ſimilar things joined together, either collectively, as a pair of gloves, or two ſimilar parts that compoſe one whole, or a ſet of things joined to make another complete, &c.

PAIR, in anatomy, an aſſemblage or conjugation of two nerves, which have their origin together in the brain, or ſpinal marrow, and thence diſtributed into the ſeveral parts of the body, the one on one ſide, and the other on the other.

PALACE, *Palatium*, a name generally given to the dwelling-houſes of kings, princes, and other great perſonages; and taking different epithets, according to the quality of the inhabitants, as imperial palace, royal palace, pontifical palace, cardinal palace, ducal palace, epiſcopal palace, &c.

PA-

PALANQUIN, a kind of chaiſe, or chair, borne by men on their ſhoulders, much uſed by the people of China, and the eaſt, as a vehicle for their eaſy conveyance from place to place.

PALATE, *Palatum*, in anatomy, the fleſh that compoſes the roof, or the upper and inner part of the mouth. See MOUTH.

PALE, *Palus*, a little pointed ſtake or piece of wood, uſed in making incloſures, ſeparations, &c.

The pale was an inſtrument of puniſhment and execution, among the ancient Romans, and ſtill continues ſo among the Turks. Hence, empaling, the paſſing a ſharp pale up the fundament through the body.

PALE, in heraldry, one of the honourable ordinaries of an eſcutcheon; being the repreſentation of a pale, or ſtake, placed upright, and comprehending the whole height of the coat from the top of the chief to the point.

PALED FLOWERS, in botany, are thoſe which have their leaves ſet about, or ſurrounding, a head or thrum, as in marigolds, &c.

PALES, or PILES, in carpentry, denote rows of ſtakes driven deep into the ground to make wooden bridges over rivers; they ſerve to ſupport the beams laid acroſs them, from one row to another, and are ſtrongly bound with croſs pieces.

PALILICIUM, in aſtronomy, the ſtar called the bull's-eye, or aldebaran. See the article ALDEBARAN.

PALING, a ſort of fenſing for fruit-trees planted in fields, wherein three ſmall poſts are erected at a foot and a half diſtance one from another, and near the top nailed to each other with croſs-bars.

In fixing the pales in form of a triangle, room is to be left for the tree to play and bow by the high winds, without galling: the trees are to be bound to a ſtake for a year or two, after which, fern or ſtraw may be ſtuffed in betwixt the tree and the uppermoſt rails to keep it upright.

If the place be open to deer, rabbits, or the like, a poſt is to be nailed to the bar between every two pales.

PALISADE, or PALISADO, in fortification, an incloſure of ſtakes or piles driven into the ground, each ſix or ſeven inches ſquare, and eight feet long, three whereof are hid under-ground.

Turning-PALISADES, an invention of M. Coehorn, in order to preſerve the paliſades of the parapet of the covert-way from the beſiegers ſhot.

He orders them ſo, that as many of them as ſtand in the length of a rod, or in about ten feet, turn up and down like traps, ſo as not to be in ſight of the enemy till they juſt bring on their attack, and yet are always ready to do the proper ſervice of paliſades.

PALISADE, in gardening, denotes a ſort of ornament; being a row of trees which bear branches and leaves from the bottom, cut and ſpread in manner of a wall along the ſide of an alley, or the like, ſo as to appear like a wall covered with leaves.

PALISSE', in heraldry, a bearing like a range of paliſades before a fortification, repreſented on a feſſe, riſing up a conſiderable height, and pointed at top, with the field appearing between them.

PALIURUS, Chriſt's-thorn, in botany, a plant which grows naturally in Paleſtine; it riſes with a pliant ſhrubby ſtalk, to the height of eight or ten feet, ſending out many weak ſlender branches, armed with thorns, garniſhed with oval leaves placed alternately, ſtanding upon foot-ſtalks near an inch long, theſe have three longitudinal veins, and are of a pale green; the flowers come out at the wings of the ſtalk in cluſters, almoſt the length of the young branches; they are of a greeniſh-yellow colour, and appear in June; they are ſucceeded by broad, roundiſh, buckler-ſhaped ſeed-veſſels, which have borders like the brim of a hat, the foot-ſtalks being faſtened to the middle; theſe have three cells, containing in each a ſingle ſeed.

This is by many perſons ſuppoſed to be the plant from which the crown of thorns, put upon the head of our Saviour, was compoſed; the truth of which is ſupported by many travellers of credit, who affirm, that this is one of the moſt common ſhrubs in the country of Judea; and from the pliableneſs of its branches, which may be eaſily wrought into any figure, it may afford a probability.

This ſhrub alſo grows wild in moſt parts of the Levant, alſo in Italy, Spain, Portugal, and the ſouth of France; it is propagated by ſowing its ſeeds, or by laying down its tender branches in the ſpring, which will take root in a year's time.

For the generical characters of paliurus, ſee the article RHAMNUS, of which it is held a ſpecies by Linnæus.

PALL, in heraldry, denotes a kind of croſs, repreſenting the pallium, or archiepiſcopal ornament ſent from Rome to the Metropolitans.

PALL, *Pallium*, in matters of dreſs. See the article PALLIUM.

PALLADIUM, in antiquity, a ſtatue of the goddeſs Pallas, ſuppoſed to have dropped down from heaven, preſerved in Troy, whereon the fate of that city is ſaid to have depended.

PALLET, among painters, a little oval table or piece of wood, or ivory, very thin and ſmooth; on, and round which, the painters place the ſeveral colours they have occaſion for, to be ready for the pencil.

The middle ſerves to mix the colours on, and to make the tints required in the work. It has no handle, but inſtead thereof, a hole at one end to put the thumb through to hold it.

PALLET, among potters, crucible-makers, &c. a wooden inſtrument, almoſt the only one they uſe, for forming, heating, and rounding their works: they have ſeveral kinds, the largeſt are oval, with a handle;

handle; others are round, or hollowed triangularly; others, in fine, are in manner of large knives, ſerving to cut off whatever is ſuperfluous on the moulds of their work.

PALLET, in gilding, an inſtrument made of a ſquirrel's tail, to take up the gold-leaves from the pillow, and to apply and extend them on the matter to be gilt.

PALLET, in heraldry, is nothing but a ſmall pale, conſiſting of one half of it in breadth, and therefore there are ſometimes ſeveral of them upon one ſhield.

PALLET is alſo a part belonging to the ballance of a watch or movement. See WATCH.

PALLIATION, or a PALLIATIVE CURE, in medicine, is when, in deſperate and incurable diſeaſes, after predicting the fatal event, the phyſician preſcribes ſome remedies for mitigating the pain, or ſome other urgent ſymptoms, as in ulcerated cancers, or cancerous fiſtulas, and the like.

Palliative indication, is where the ſymptoms of a diſeaſe give too much trouble and danger to have their cure deferred till the diſeaſe whereon they depend is removed: here the ſymptoms themſelves are to be cured or mitigated apart.

PALLIER, or PAILLIER, in building, denotes a landing-place in a ſtair-caſe.

PALLIFICATION, the ſtrengthening the foundation of any building, by driving piles into the ground. See the articles PILE and FOUNDATION.

PALLIUM, or PALL, an archiepiſcopal veſtment, of white woollen cloth, about the breadth of a border, made round, and thrown over the ſhoulders.

Upon this border there are two others of the ſame matter and form, one of which falls down upon the breaſt, and the other upon the back, each having a red croſs upon it; ſeveral croſſes of the ſame colour being likewiſe upon the upper part of it, about the ſhoulders.

PALM, *Palma*, in anatomy, the inſide of the hand, called alſo vola. See the articles HAND and PALMARIS.

PALM is alſo a meaſure of length. See the article MEASURE.

PALM-SUNDAY, in the Chriſtian church, the Sunday next before Eaſter; being ſo called in memory of our Saviour's triumphal entry into Jeruſalem, when the multitude that attended him ſtrewed palm-branches in his way.

PALM-TREE, phœnix, in botany, &c. See the article PHOENIX,.

PALMA CHRISTI, in botany. See the article RICCINUS.

PALMARIS MUSCULUS, one of the flexor-muſcles of the hand, ſo called as being inſerted into the palm of the hand by a broad expanded tendon: its office ſeems to be the conſtriction of the palm. There is alſo another muſcle of the hand called pulmaris brevis, and quadratus, in form of a ſmall maſs of fleſh, which adheres to the aponeuroſis of the former muſcle, above the abductor muſcle of the little finger: it is ſaid to aſſiſt in drawiug together the hand; but Heiſter obſerves, that both theſe muſcles are found wanting in diſſections.

PALMATED, ſomething reſembling the ſhape of the hand: thus we ſay palmated leaves, roots, ſtones, &c.

PALMETTO, in botany. See the article CHAMÆROPS.

PALMIPEDES, among ornithologiſts, the ſame with web-footed birds.

PALMISTRY, a kind of divination, or rather a deceitful art practiſed by gypſies, who pretend to foretel future events by looking upon the lines and marks of the hand: it is prohibited by ſtat. 1 and 2 Phil. and Mar. c. 4.

PALPABLE, ſomething perceivable by the ſenſes, particularly that of feeling.

PALPITATION, in medicine, a ſpaſtic contraction of the heart, when it leaps and beats violently.

PALSY, παραλυσις, in medicine, a diſeaſe wherein the body, or ſome of its members, loſe their motion, and ſometimes their ſenſation or feeling.

This diſeaſe never is acute, is often tedious, and in old people almoſt incurable; and the patient for the moſt part drags a miſerable life. For the vigour of his mind, together with his memory, are loſt, or vaſtly impaired; he totters and ſhakes, and becomes a diſmal ſight; as if no longer a man, but an animal half dead.

PALUMBERIUS, accipiter, the goſhawk. See the article GOSHAWK.

PALUMBUS, the ringdove, a beautiful ſpecies of pigeon, with the neck white on each ſide, and a brown ſpot behind. ſee the article COLOMBA.

PALUS MEOTIS. See MEOTIS.

PALY, or PALE', in heraldry, is when the ſhield is divided into four or more equal parts, by perpendicular lines falling from the top to the bottom.

PALY-BENDY is when the eſcutcheon is divided by perpendicular lines, which is paly; and alſo by diagonals, which is called bendy.

PANACEA, among phyſicians, denotes an univerſal medicine, or a remedy for all diſeaſes; a thing impoſſible to be obtained, according to no leſs an author than Boerhaave.

Some alſo give the appellation panacea to certain plants, called in Engliſh alheals. See the article ALHEAL.

PANADA, a diet conſiſting of bread boiled in water to the conſiſtence of a pulp, and ſweetened with a little ſugar. It is given to young children,

and to ſick perſons, whoſe digeſtion is weak, or where ſtronger foods would be improper. It is ſometimes made thin, to ſerve as a drink.

PANAX, *Ginſeng*, in botany. See the article GINSENG.

PANCHYMAGOGUE, in pharmacy, a name given to ſome cathartic extracts, that have the reputation of purging off all kinds of humours.

PANCRATIUM, in botany, a genus of plants; the characters of its flowers are; the cup is an oblong, obtuſe, compreſſed ſpatha, opening on the ſide, and withers; the corolla conſiſts of ſix lanceolated petals, and a cylindrical, funnel-ſhaped nectarium, on the outſide of which, above the baſe, the petals are inſerted: the ſtamina are ſix ſubulated filaments, inſerted in the brim of the nectarium, and topped with oblong proſtrate antheræ; the germen is obtuſe and trigonal; the ſtyle ſlender, and longer than the ſtamina, and crowned with an obtuſe ſtigma. The fruit is a roundiſh three-cornered capſule, formed of three valves, having three cells, which contain a number of globoſe ſeeds.

There are ſeveral ſpecies of the pancratium, which are all bulbous rooted; the moſt eſteemed are the Weſt-Indian kinds; the flowers are large, growing in bunches on the top of the ſtalks; they are of a pure white, and have a moſt delightful fragrancy. Theſe plants require a hot-houſe to preſerve them, and are increaſed by the off-ſets which ariſe from the root.

PANCREAS, in anatomy, popularly called the ſweet-bread, is a large gland, of a flattiſh ſhape and fleſhy colour, extended behind the ſtomach, and reaching from the duodenum tranſverſely towards the ſpleen. Its length is eight or nine inches; its breadth about two fingers, or two and a half; its thickneſs about one finger; and its weight about three ounces. In man, the ſhape of a pancreas very much reſembles the tongue of a dog; it is broadeſt towards the duodenum, and gradually narrower towards the ſpleen. Its ſubſtance is glandulous, and it ſeems formed by a conglomeration of many glands. It is ſurrounded with a membrane, which is contiguous with the peritonæum: it has arteries from the cœliac and ramus ſplenicus; and veins alſo from the ſplenic vein; its nerves are from the par vagum and the intercoſtals; and, finally, it has an excretory duct, which is ſituated in the middle of the pancreas, where it reſembles an empty vein, and is about the thickneſs of a ſmall ſtraw. This duct terminates in the duodenum, which it enters obliquely, four or five fingers-breadth below the pylorus, uſually at the ſame orifice with the ductus cholidocus; but ſometimes it has a double aperture.

The uſe of the pancreas is to ſecrete a peculiar liquor, called the pancreatic juice, which is of a ſalivoſe nature, and is carried by the pancreatic duct into the duodenum, where it ſerves to dilute the chyle, to render it more fluid, and fit to enter the mouths of the lacteals; and, perhaps, to temper and dilute the bile, to change its viſcidity, bitterneſs, colour, &c. and make it mix with the chyle, in order to reduce the ſeveral taſtes, odours, and properties of the ſeveral foods, into one homogeneous one.

PANDECTS, in the civil law, collections made by Juſtinian's order, of five hundred and thirty-four deciſions of the ancient lawyers, on ſo many queſtions occurring in the civil law; to which that emperor gave the force and authority of law, by an epiſtle prefixed to them. The pandects conſiſted of fifty books, and make the firſt part of the body of the civil law.

PANEGYRIC, on oration in praiſe of ſome extraordinary thing, perſon, or virtue.

Panegyrics were anciently made in the public and ſolemn aſſemblies of the Greeks, either at their games, their feaſts, or religious meetings. To render them the more ſolemn, they uſed to begin with the praiſes of the deity, in whoſe honour the games, &c. were celebrated; then they deſcended to the praiſes of the people or country where they were celebrated; then to the princes or magiſtrates who preſided at them; and at length to the champions, eſpecially thoſe who had gained the prize.

Panegyric is ranked among the demonſtrative kinds of orations, whereof there are commonly reckoned two kinds, viz. the artificial, where every thing is reduced to certain heads; and the other natural, where the order of hiſtory is obſerved.

PANEL, in law, ſignifies a ſchedule, or ſmall roll of parchment, in which is contained the names of the jurors returned by the ſheriff, to paſs upon trial; ſo that the impanelling of a jury, is no more than the ſheriff's entering them upon his panel or roll.

PANIC, denotes an ill-grounded terror or fright.

PANICLE, in botany, denotes a ſoft woolly beard, on which the ſeeds of ſome plants, as millet, reeds, &c. hang.

PANICUM, panic, in botany, a genus of plants, the corolla of which is compoſed of two oval, acute, pointed valves: the ſtamina are three ſhort hairy filaments, topped with oblong antheræ: the ſeed is ſingle and roundiſh, and incloſed in the corolla.

Panic is cultivated in ſeveral parts of Germany, France, and Italy, as corn, for the ſuſtenance of the inhabitants, of which they make cakes or bread; but its nutriment is not reckoned ſo good as millet.

Panic-ſeed is accounted drying, refrigerant, and aſtringent; and therefore recommended in ſpitting of blood, and nocturnal pollutions.

PANNEL, in joinery, is a tympanum, or ſquare piece of thin wood, ſometimes carved, framed, or grooved in a larger piece, between two upright pieces and two croſs pieces.

PANNEL, in masonry, is one of the faces of a hewn stone.

PANNELS *of a Saddle*, are two cushions or bolsters, filled with cow's, deer's, or horse's hair, and placed under the saddle, on each side, to prevent the bows and bands from galling the horse.

PANNICULUS CARNOSUS, in comparative anatomy, a robust fleshy tunic, situated in beasts, between the tunic and the fat; by means of which, they can move their skin in whole or part: it is altogether wanting in mankind.

PANTALOON, a sort of garment, consisting of breeches and stockings all of one piece; said to have been first introduced by the Venetians.

In a theatrical sense, pantaloon denotes a buffoon, who performs grotesque dances; and hence is used, by some, for the habit or dress worn by such persons.

PANTHEA, in antiquity, statues composed of the figures or symbols of several divinities.

PANTHEON, in Roman antiquity, a temple of a circular form, dedicated to all the gods: it was built by Agrippa, son-in-law to Augustus; but is now converted into a church, and dedicated to the Virgin and all the martyrs.

PANTHER, *Panthera*, in zoology, the female leopard. See LEOPARD.

PANTOMIME, in antiquity, a person who imitates all sorts of actions and characters, by mere gestures, without speaking a word.

PAPAVER, the poppy, in botany. See the article POPPY.

PAPAW, *Carica*, in botany, a genus of the dioecia class, producing male and female flowers on different plants; the male flower is monopetalous and infundibuliform, with the limb cut into five parts; the corolla of the female flower is pentapetalous, the petals being lanceolato-linear, obtuse on both sides, very long, erect below the middle, but above the middle bending outwards and downwards. The fruit is a very large, oblong, fleshy berry, angulated with five furrows, having five cells containing a number of small, ovate, furrowed seeds, inclosed in a pulp.

The papaw rises with a thick, soft, herbaceous stem, to the height of eighteen or twenty feet, which is naked till within two or three feet of the top, and hath marks of the vestages of the fallen leaves great part of its length. The leaves come out on every side of the stem, upon long footstalks; those which are situated undermost are almost horizontal, but those on the top are erect; these leaves are very large, and divide into many lobes, which are deeply sinuated or cut into irregular divisions: the whole plant abounds with a milky acrid juice, which is esteemed good for the ring-worm. The stem of the plant, and also the footstalks of the leaves, are hollow in the middle; the flowers of the male plants are produced from between the leaves on the upper part of the plant on every side; they have footstalks near two feet long, at the ends of which the flowers stand in loose clusters, each having a separate short footstalk, these are of a pure white, and have an agreeable odour. The flowers of the female papaw also come out between the leaves toward the upper part of the plant upon very short footstalks, sitting close to the stem. The fruit is about the size of a common melon, and are of different forms; some are angular, and compressed at both ends, others are oval or globular, and some pyramidal; the fruit also abounds with the same acrid milky juice as the plants. This fruit, when ripe, is by the inhabitants of the Caribbee islands eaten with pepper and sugar, as melons.

These plants are raised from seeds, but being tender, they require a hot-house to preserve them in this climate.

PAPER, *παπυρος*, sheets of a thin matter, made of some vegetable substance.

The materials on which mankind have, in different ages, contrived to write their sentiments, have been extremely various; in the early ages they made use of stones, and tables of wood, wax, ivory, &c. See the article BOOK.

Paper, with regard to the manner of making it, and the materials employed therein, is reducible to several kinds; as Egyptian paper, made of the rush papyrus; bark paper, made of the inner rind of several trees; cotton-paper; incombustible paper; and the European paper, made of linen rags.

Linen, or European paper, appears to have been first introduced among us towards the beginning of the XIVth century; but by whom this valuable commodity was invented, is not known. The method of making paper of linen or hempen rags, is as follows: the linen-rags being carried to the mill, are first sorted, then washed very clean in puncheons, whose sides are grated with strong wires, and the bottoms bored full of holes. After this they are fermented, by laying them in heaps, close covered with sacking, till they sweat and rot; which is commonly done in four or five days. When duly fermented, they are twisted into handfuls cut small, and thrown into oval mortars, made of well-seasoned oak, about half a yard deep, with an iron-plate at bottom, an inch thick, eight inches broad, and thirty long: in the middle is a washing-block, grooved, with five holes in it, and a piece of hair-sieve fastened on the inside: this keeps the hammers from touching it, and prevents any thing going out except the foul water. These mortars are continually supplied with water, by little troughs, from a cistern, fed by buckets fixed to the several floats of a great wheel, which raises the wooden hammers, for pounding the rags in the mortars. When the rags are beaten to a certain degree, called the first stuff, the pulp is removed into boxes, made like

like corn-chandlers bins, with the bottom board aſlant, and a little ſeparation on the front, for the water to drain away. The pulp of the rags being in, they take away as many of the front-boards as are needful, and preſs the maſs down hard with their hands: the next day they put on another board, and add more pulp, till the box is full: and here it remains mellowing a week, more or leſs, according to the weather. After this, the ſtuff is again put into clean mortars, and is beaten a-freſh, and removed into boxes, as before; in which ſtate it is called the ſecond ſtuff. The maſs is beat a third time, till ſome of it being mixed with fair water, and brewed to and fro, appears like flour and water, without any lumps in it; it is then fit for the pit-mortar, where it is perfectly diſſolved, and is then carried to the vat, to be formed into ſheets of paper.

But lately, inſtead of pounding the rags to a pulp with large hammers, as above, they make uſe of an engine, which performs the work in much leſs time. This engine conſiſts of a round ſolid piece of wood, into which are faſtened ſeveral long pieces of ſteel, ground very ſharp. This is placed in a large trough with the rags, and a ſufficient quantity of water. At the bottom of the trough is a plate with ſteel bars, ground ſharp like the former; and the engine being carried round with prodigious velocity, reduces the rags to a pulp in a very ſhort time. It muſt be obſerved, that the motion of the engine cauſes the water in the trough to circulate, and by that means, conſtantly returns the ſtuff to the engine. The trough is conſtantly fed with clean water at one end, while the dirty water from the rags is carried off at the other, through a hole, defended with wire gratings, in order to hinder the pulp from going off with the dirty water.

When the ſtuff is ſufficiently prepared as above, it is carried to the vat and mixed with a proper quantity of water, which they call priming the vat. The vat is rightly primed, when the liquor has ſuch a proportion of the pulp, as that the mould, on being dipped into it, will juſt take up enough to make a ſheet of paper of the thickneſs required. The mould is a kind of ſieve, exactly of the ſize of the paper to be made, and about an inch deep, the bottom being formed of fine braſs wire, guarded underneath with ſticks to prevent its bagging down, and to keep it horizontal; and further, to ſtrengthen the bottom, there are large wires placed in parallel lines, at equal diſtances, which form thoſe lines viſible in all white paper, when held up to the light; the mark of the paper is alſo made in this bottom, by interweaving a large wire in any particular form. This mould the maker dips into the liquor, and gives it a ſhake as he takes it out, to clear the water from the pulp. He then ſlides it along a groove to the cocher, who turns out the ſheet upon a felt, laid on a plank, and lays another felt on it, and returns the mould to the maker, who, by this time, has prepared a ſecond ſheet, in another mould: and thus they proceed, laying alternately a ſheet and a felt, till they have made ſix quires of paper, which is called a poſt; and this they do with ſuch ſwiftneſs, that, in many ſorts of paper, two men make twenty poſts, or more, in a day. A poſt of paper being made, either the maker or coucher whiſtles; on which four or five men advance, one of whom draws it under the preſs, and the reſt preſs it with great force, till all the water is ſqueezed from it; after which it is ſeparated, ſheet by ſheet, from the felts, and laid regularly one ſheet upon another; and having undergone a ſecond preſſing, it is hung up to dry. When ſufficiently dried, it is taken off the lines, rubbed ſmooth with the hands, and laid by till ſized, which is the next operation. For this they chooſe a fine temperate day, and having boiled a proper quantity of clean parchment or vellum-ſhavings, in water, till it comes to a ſize, they prepare a fine cloth on which they ſtrew a due proportion of white vitriol and roch-allum, finely powdered, and ſtrain the ſize through it, into a large tub; in which they dip as much paper at once as they can conveniently hold, and with a quick motion give every ſheet its ſhare of the ſize, which muſt be as hot as the hand can well bear it. After this, the paper is preſſed, hung up ſheet by ſheet to dry; and being taken down, is ſorted, and what is only fit for outſide-quires, laid by themſelves: it is then told into quires, which are folded and preſſed. The broken ſheets are commonly put together, and two of the worſt quires are placed on the outſide of every ream or bundle; and being tied up in wrappers, made of the ſettling of the vat, it is fit for ſale.

Paper is of various kinds, and uſed for various purpoſes: with regard to colour, it is chiefly diſtinguiſhed into white, blue, and brown; and with regard to its dimenſions, into atlas, elephant, imperial, ſuper-royal, royal, medium, demy, crown, fool's-cap, and pot-paper.

Blotting-PAPER, is paper not ſized, and into which, ink readily ſinks: it is uſed in books, &c. inſtead of ſand, to prevent blotting; and alſo by apothecaries for filtring.

Teint, or *Demi-Teint*-PAPER, is a paper uſed for deſigning on, and is either blue, brown, or biſtered.

Biſtered-PAPER, is white-paper waſhed over with a ſponge dipped in ſoot-water. Its uſe is to ſave the labour of the crayon, in places which are to be ſhadowed the ſame depth as the teint of this paper: as to the light places, they are made with chalk.

Marbled-PAPER. See MARBLING.

PAPIA, or ORVALA, in botany. See the article ORVALA.

PAPILIO, the butterfly, in zoology, a numerous genus of four-winged insects, of the lepidoptera order, distinguished by clavated antennæ.

The butterflies are so numerous, that authors commonly divide them into classes or subdivisions, according to the number of their legs, some having six and others only four legs, under each of which are comprehended a multitude of beautiful species, distinguished by the different colours and variegations of their wings.

PAPILIONACEOUS, among botanists, an appellation given to the flowers of certain plants, from their resembling the figure of a butterfly with its wings expanded; they always consist of four petals, the upper one is called the vexillum, or standard; the two petals, which compose the sides, are called the alæ, or wings; and the lowest petal is termed the carina, or keel, which in some flowers is intire, and in others divided into two segments.

All plants bearing papilionaceous flowers, belong to the diadelphia class of Linnæus: such are peas, beans, kidney-beans, vetches, and other legumes.

PAPILLA, the nipple of the breast, in anatomy, See BREAST.

There are also papillæ of the skin and tongue. See CUTIS and TONGUE.

PAPPUS, in botany, a soft downy substance, adhering to the upper part of the seeds of divers plants, as of thistles, hawkweeds, dandelion, &c. Its use is to spread them when ripe, by sustaining them in the air so that they may be conveyed to a great distance.

PAPULÆ, a name used, by several authors, for eruptions on the skin of any sort.

PAR, in commerce, signifies any two things equal in value; and in money-affairs, it is so much as a person must give of one kind of specie, to render it just equivalent to a certain quantity of another.

In the exchange of money with foreign countries, the person to whom a bill is payable, is supposed to receive the same value as was paid the drawer by the remitter; but this was not always the case, with respect to the intrinsic value of the coins of different countries, which is owing to the fluctuation in the prices of exchange amongst the several European countries, and the great trading cities.

The par, therefore, differs from the course of exchange in this, that the par of exchange shews what other nations should allow in exchange, which is rendered certain and fixed, by the intrinsic value of the several species to be exchanged: but the course shews what they will allow in exchange; which is uncertain and contingent, sometimes more and sometimes less; and hence the exchange is sometimes above and sometimes under par. See the article EXCHANGE.

PARABLE, a fable, or allegorical instruction, founded on something real or apparent in nature or history, from which a moral is drawn, by comparing it with something in which the people are more immediately concerned: such are the parables of Dives and Lazarus, of the Prodigal Son, of the Ten Virgins, &c.

Kircher derives the use of parables from the Egyptians. Some make a difference between a parable and a fable; but Grotius and others use the two terms promiscuously.

Parables are certainly a most delicate way of expressing disagreeable truths on the mind, and in many cases have the advantage of a more open reproof, and even of formal lessens of morality: thus Nathan made David sensible of his guilt by a parable; and thus our Saviour, in attacking the prejudices of his countrymen, always spoke to them in parables.

PARABOLA, in geometry, a figure arising from the section of a cone, when cut by a plane parrallel to one of its sides. See the article CONIC SECTIONS.

To describe a parabola in plano, draw a right line AB (plate LXXII. fig. 7.) and assume a point C without it; then in the same plane with this line and point, place a square rule DEF, so that the side DE may be applied to the right line AB, and the other EF turned to the side on which the point C is situated. This done, and the thread FGC, exactly of the length of the side of the rule, EF, being fixt at one end to the extremity of the rule F, and at the other to the point C, if you slide the side of the rule DE along the right line AB, and by means of a pin, G, continually apply the thread to the side of the rule, EF, so as to keep it always stretched as the rule is moved along, the point of this pin will describe a parabola GHO.

Definitions. 1. The right line AB is called the directrix. 2. The point C is the focus of the parabola. 3. All perpendiculars to the directrix, as LK, MO, &c. are called diameters; the points, where these cut the parabola, are called its vertices; the diameter BI, which passes through the focus C, is called the axis of the parabola; and its vertex, H, the principal vertex. 4. A right line terminated on each side by the parabola, and bissected by a diameter, is called the ordinate applicate, or simply the ordinate to that diameter. 5. A line equal to four times the segment of any diameter, intercepted between the directrix and the vertex where it cuts the parabola, is called the latus rectum, or parameter of that diameter. 6. A right line which touches the parabola only in one point and being produced on each side falls without it, is a tangent to it in that point.

Cartesian PARABOLA, is a curve of the second order, expressed by the equation $xy = ax^3 + bx^2 + cx + a$, containing four infinite legs, viz. two hyperbolic ones tending contrary ways, and two para-

parabolic legs joining them, being the fixty-ſixth ſpecies of lines of the third order according to Sir Iſaac Newton, called by him a trident.

Diverging PARABOLA, a name given by Sir Iſaac Newton to five different lines of the third order, expreſſed by the equation $yy = ax^3 + bx^2 + cx + d$.

PARABOLIC CONOID, in geometry, a ſolid generated by the rotation of a parabola about its axis: its ſolidity is $= \frac{1}{2}$ of that of its circumſcribing cylinder.

The circles conceived to be the elements of this figure are in arithmetical proportion, decreaſing towards the vertex.

A parabolic conoid is to a cylinder of the ſame baſe and height, as 1 to 2, and to a cone of the ſame baſe and height, as $1\frac{1}{2}$ to 1. See GAUGING.

PARABOLIC CUNEUS, a ſolid figure formed by multiplying all the D B's (plate LXXII. fig. 8.) into the D S's; or which amounts to the ſame, on the baſe A P B erect a priſm, whoſe altitude is A S; this will be a parabolical cuneus, which of neceſſity will be equal to the parabolical pyramidoid, as the component rectangles in one are ſeverally equal to all the component ſquares in the other.

PARABOLIC PYRAMIDOID, a ſolid figure generated by ſuppoſing all the ſquares of the ordinate applicates in the parabola ſo placed as that the axis ſhall paſs through all the centers at right angles; in which caſe the aggregate of the planes will form the parabolic pyramidoid.

The ſolidity hereof is had by multiplying the baſe by half the altitude, the reaſon of which is obvious; for the component planes being a ſeries of arithmetical proportionals beginning from 0, their ſum will be equal to the extremes multiplied by half the number of terms.

PARABOLIC SPACE, the area contained between any entire ordinate as V V (plate LXXII. fig. 9.) and the curve of the incumbent parabola.

The parabolic ſpace is to the rectangle of the ſemi-ordinate into the abſciſs, as 2 to 3; to a triangle inſcribed on the ordinate as a baſe, it is as 4 to 3.

Every parabolical and paraboloidical ſpace is to the rectangle of the ſemi-ordinate into the abſciſs, as $r \times y\ (m + r)$ to xy; that is, as r to $m + r$.

Segment of a PARABOLIC SPACE, is that ſpace included between two ordinates.

PARABOLIC SPINDLE, in gauging; a caſk of the ſecond variety is called the middle fruſtum of a parabolic ſpindle.

The parabolic ſpindle is eight-fifteenths of its circumſcribing cylinder.

PARABOLOIDES, a name given to parabolas of the higher kind, which are algebraic curves.

PARACENTESIS, an operation in ſurgery commonly called tapping.

PARACENTRIC MOTION, in aſtronomy, denotes ſo much as a revolving planet approaches nearer to, or recedes from the ſun, or center of attraction.

PARACENTRIC *Solicitation of Gravity*, is much the ſame with the centrepetal force.

PARACLET, the COMFORTER, a name given to the Holy Ghoſt. See the article TRINITY.

PARADE, the placing any thing to public view, with all its advantages and ornaments.

PARADE, in war, is a place where the troops meet to go upon guard, or any other ſervice.

PARADE, in fencing, is the action of parrying or turning off any thruſt.

PARADISE, a term principally uſed for the garden of Eden, in which Adam and Eve were placed immediately upon their creation.

The celeſtial paradiſe is that place of pure and refined delight in which the ſouls of the bleſſed enjoy everlaſting happineſs.

Bird of PARADISE, *Paradiſæa*, in ornithology, a genus of birds of the order of the picæ, the beak of which is of a cultratoſubulated form, and acute; the forehead is gibbous, and the two middle feathers are extremely long, and very firm.

PARADOX, in philoſophy, a propoſition ſeemingly abſurd, as being contrary to ſome received opinion; but yet true in fact.

PARAGRAPH, in general, denotes a ſection or diviſion of a chapter, and in references is marked thus ¶.

PARALEPSIS, παραλειψις, in rhetoric, the pretence of paſſing over a thing, and yet mentioning it by the bye.

PARALLACTIC, in general, ſomething relating to the parallax of heavenly bodies. See the article PARALLAX.

PARALLAX, παραλλαξις, in aſtronomy, denotes a change of the apparent place of any heavenly body, cauſed by being ſeen from different points of view; or it is the difference between the true and apparent diſtance of any heavenly body from the zenith.

Thus let A B (plate LXXII. fig. 10.) be a quadrant of a great circle on the earth's ſurface, A the place of the ſpectator, and the point V in the heavens the vertex and zenith. Let V N H repreſent the ſtarry firmament, A D the ſenſible horizon, in which ſuppoſe the ſtar C to be ſeen, whoſe diſtance from the center of the earth is T C. If this ſtar were obſerved from the center T, it would appear in the firmament in E, and elevated above the horizon by the arch D E; this point E is called the true place of the phænomenon or ſtar. But an obſerver viewing it from the ſurface of the earth at A, will ſee it at D, which is called its viſible or apparent place; and the arch D E, the diſtance between the true and viſible place, is what aſtronomers call the parallax of the ſtar, or other phænomenon.

If the ſtar riſe higher above the horizon to M, its true place viſible from the center is P, and its apparent place N; whence its parallax will be the the arch PN, which is leſs than the arch DE. The horizontal parallax, therefore, is the greateſt; and the higher a ſtar riſes, the leſs is its parallax; and if it ſhould come to the vertex or zenith, it would have no parallax at all: for when it is in Q, it is ſeen both from T and A in the ſame line TAV, and there is no difference between its true and apparent or viſible place. Again, the farther a ſtar is diſtant from the earth, ſo much the leſs is its parallax: thus the parallax of the ſtar F is only GD, which is leſs than DE the parallax of C. Hence it is plain, that the parallax is the difference of the diſtances of a ſtar from the zenith when ſeen from the center and from the ſurface of the earth: for the true diſtance of the ſtar M from the zenith is the arch VP, and its apparent diſtance VN, the difference between which PN is the parallax.

Theſe diſtances are meaſured by the angles VTM, and VAM, but VAM—VTM=TMA. For the external angle VAM=∠ATM+∠AMT, the two inward and oppoſite angles; ſo that AMT meaſures the parallax, and upon that account is itſelf frequently called the parallax: and this is always the angle under which the ſemi-diameter of the earth, AT, appears to an eye placed in the ſtar; and therefore where this ſemi-diameter is ſeen directly, there the parallax is greateſt, viz. in the horizon. When the ſtar riſes higher, the ſine of the parallax is always to the ſine of the ſtars diſtance from the zenith, as the ſemi-diameter of the earth to the diſtance of the ſtar from the earth's center: hence if the parallax of a ſtar be known at any one diſtance from the zenith, we can find its parallax at any other diſtance.

If we have the diſtance of a ſtar from the earth, we can eaſily find its parallax: for on the triangle TAC rectangular at A, having the ſemi-diameter of the earth, and TC the diſtance of the ſtar, the angle ACT, which is the horizontal parallax, is found by trigonometry; and on the other hand, if we have this parallax, we can find the diſtance of the ſtar; ſince in the ſame triangle, having AT, and the ∠ACT, the diſtance TC may be eaſily found.

Aſtronomers therefore, have invented ſeveral methods for finding the parallaxes of ſtars, in order thereby to diſcover their diſtances from the earth. However, the fixed ſtars are ſo remote as to have no ſenſible parallax; and even the ſun, and all the primary planets, except Mars and Venus when in perigee, are at ſo great diſtances from the earth, that their parallax is too ſmall to be obſerved. In the moon, indeed, the parallax is found to be very conſiderable, which in the horizon amounts to a degree or more, and may be found thus; in an eclipſe of the moon, obſerve when both its horns are in the ſame vertical circle, and at that inſtant take the altitudes of both horns: the difference of theſe two altitudes being halved, and added to the leaſt, or ſubſtracted from the greateſt, gives nearly the viſible or apparent altitude of the moon's center; and the true altitude is nearly equal to the altitude of the center of the ſhadow at that time. Now we know the altitude of the ſhadow, becauſe we know the place of the ſun in the ecliptic, and its depreſſion under the horizon, which is equal to the altitude of the oppoſite point of the ecliptic in which is the center of the ſhadow. And therefore having both the true altitude of the moon and the apparent altitude, the difference of theſe is the parallax required. But as the parallax of the moon increaſes as ſhe approaches towards the earth, or the perigæum of her orbit; therefore aſtronomers have made tables which ſhew the horizontal parallax for every degree of its anomaly.

The parallax always diminiſhes the altitude of a phænomenon, or makes it appear lower than it would do, if viewed from the center of the earth; and this change of the altitude may, according to the different ſituation of the ecliptic and equator in reſpect of the horizon of the ſpectator, cauſe a change of the latitude, longitude, declination and right-aſcenſion of any phænomenon, which is called their parallax.

The parallax, therefore, increaſes the right and oblique aſcenſion; diminiſhes the deſcenſion; diminiſhes the northern declination and latitude in the eaſtern part, and increaſes them in the weſtern; but increaſes the ſouthern both in the eaſtern and weſtern part; diminiſhes the longitude in the weſtern part, and increaſes it in the eaſtern. Hence it appears, that the parallax has juſt oppoſite effects to refraction. See the article REFRACTION.

Annual PARALLAX, the change of the apparent place of a heavenly body, which is cauſed by being viewed from the earth in different parts of its orbit round the ſun. See the article EARTH.

The annual parallax of all the planets is found very conſiderable, but that of the fixed ſtars is imperceptible. See STAR.

PARALLAX, in levelling, denotes the angle contained betweeen the line of the true level, and that of the apparent level.

PARALLEL, in geometry, an appellation given to lines, ſurfaces and bodies every where equidiſtant from each other; and which though infinitely produced would never meet.

PARALLEL PLANES, are ſuch planes as have all the perpendiculars drawn betwixt them equal to each other.

PARALLEL RAYS, in optics, are thoſe which keep at an equal diſtance from the viſible object to the eye, which is ſuppoſed to be infinitely remote from the object.

PARALLEL RULER, or PARALLELISM, an inſtrument conſiſting of two wooden, braſs, &c. rulers, equally broad every where; and ſo joined together by croſs blades as to open to different intervals, accede and recede, and yet ſtill retain their parallelism.

PARALLELS, or *Parallel Circles*, in geography, called alſo parallels or circles of latitude, are leſſer circles of the ſphere, conceived to be drawn from weſt to eaſt, through all the points of the meridian, commencing from the equator to which they are parallel, and terminating with the poles.

They are called parallels of latitude, becauſe all places lying under the ſame parallel, have the ſame latitude.

PARALLELS *of Latitude*, in aſtronomy, are leſſer circles of the ſphere parallel to the ecliptic, imagined to paſs through every degree and minute of the colures.

They are repeſented on the globe by the diviſions on the quadrant of altitude, in its motion round the globe, when ſcrewed over the pole of the ecliptic.

PARALLELS *of Altitude*, or ALMUCANTARS, are circles parallel to the horizon, imagined to paſs through every degree and minute of the meridian between the horizon and zenith, having their poles in the zenith.

PARALLELS *of Declination*, in aſtronomy, are the ſame with parallels of latitude in geography.

PARALLEL *Sphere*, that ſituation of the ſphere, wherein the equator coincides with the horizon, and the poles with the zenith and nadir. See the article SPHERE.

PARALLEL *Sailing*, in navigation, is the ſailing under a parallel of latitude.

PARALLELEPIPED, or PARALLELOPIPED, in geometry, a regular ſolid comprehended under ſix parallelograms, the oppoſite ones whereof are ſimilar, parallel and equal.

All parallelepipeds, priſms, cylinders, &c. whoſe baſes and heights are equal, are themſelves equal.

A diagonal plane divides a parallelepiped into two equal priſms; ſo that a triangular priſm is half a parallelepiped upon the ſame baſe, and of the ſame altitude.

All parallelepipeds, priſms, cylinders, &c. are in a ratio compounded of their baſes and altitudes; wherefore, if their baſes be equal, they are in proportion to their altitudes; and converſely.

All parallelepipeds, cylinders, cones, &c. are in a triplicate ratio of their homologous ſides, and alſo of their altitudes.

Equal parallelepipeds, priſms, cones, &c. reciprocate their baſes and altitudes.

PARALLELISM, the ſituation or quality whereby any thing is denominated parallel. See the article PARALLEL.

PARALLELISM *of the Earth's Axis*, in aſtronomy, that ſituation of the earth's axis, in its progreſs through its orbit, whereby it is ſtill directed towards the pole-ſtar; ſo that if a line be drawn parallel to its axis, while in any one poſition, the axis, in all other poſitions, will be always parallel to the ſame line.

This parallelism is the reſult of the earth's double motion, viz. round the ſun, and round its own axis; or its annual and diurnal motion; and to it we owe the viciſſitudes of ſeaſons, and the inequality of day and night. See the article EARTH.

PARALLELOGRAM, in geometry, a quadrilateral right-lined figure, whoſe oppoſite ſides are parallel and equal to each other. It is generated by the equable motion of a right line always parallel to itſelf. When it has all its four angles right, and only its oppoſite ſides equal, it is called a rectangle or oblong. When the angles are all right, and the ſides equal, it is called a ſquare. If all the ſides are equal, and the angles unequal, it is called a rhombus or lozenge: and if the ſides and angles be unequal, it is called a rhomboides.

PARALOGISM, in logic, a falſe reaſoning, or a fault committed in demonſtration, when a conſequence is drawn from principles that are falſe; or, though true, are not proved; or when a propoſition is paſſed over that ſhould have been proved by the way.

A paralogiſm differs from a ſophiſm in this, that the ſophiſm is committed out of deſign and ſubtlety, and the paralogiſm out of miſtake and for want of ſufficient light and application. See SOPHISM and DEMONSTRATION.

PARALYSIS, the palſy. See PALSY.

PARALYTIC, a perſon afflicted with the palſy. See the article PALSY.

PARAMETER, in conic ſections, a conſtant line, otherwiſe called latus rectum. See the articles ELLIPSIS, HYBERBOLA, and PARABOLA.

The parameter is ſaid to be conſtant, becauſe in the parabola, the rectangle under it and any abſciſs is always equal to the ſquare of the correſponding ſemi-ordinate; and in the ellipſis and hyperbola, it is a third proportional to the conjugate and tranſverſe axis.

PARAMOUNT, in law, ſignifies the ſupreme lord of the fee. See FEE.

PARAPET, in fortification, an elevation of earth deſigned for covering the ſoldiers from the enemies cannon or ſmall ſhot. The thickneſs of the parapet is from eighteen to twenty feet; its height is ſix feet on the inſide, and four or five on the outſide. It is raiſed on the rampart, and has a ſlope above called the ſuperior talus, and ſometimes the glacis of the parapet. The exterior talus of the parapet is the ſlope facing the country; there is a banquette or two for the ſoldiers who defend the parapet to mount upon, that they may the better

diſcover the country, foſſe, and counterſcarpe, and fire as they find occaſion. See the articles GLACIS, TALUS, BANQUETTE, &c.

Parapet of the covert way, or corridor, is what covers that way from the ſight of the enemy, which renders it the moſt dangerous place for the beſiegers, becauſe of the neighbourhood of the faces, flanks, and curtins of the place.

PARAPET is alſo a little wall raiſed breaſt-high on the banks of bridges, keys, or high buildings, to ſerve as a ſtay, and prevent people's falling over.

PARAPHIMOSIS, in medicine, a diſorder of the penis, wherein the prepuce is ſhrunk, and withdrawn behind the glands, ſo as not to be capable of being brought to cover the ſame; which generally happens in venereal diſorders. See the article PREPUCE, &c.

PARAPHRASE, παραφρασις, an explanation of ſome text, in clearer and more ample terms, whereby is ſupplied what the author might have ſaid or thought on the ſubject; ſuch are eſteemed Eraſmus's paraphraſe on the New Teſtament, the Chaldee paraphraſe on the Pentateuch, &c.

PARAPHROSINE, a word uſed by medical writers to expreſs a delirium, or an alienation of mind in fevers, or from whatever cauſe.

PARAPLEGIA, or PARAPLEXIA, in medicine, a ſpecies of paralyſis, or palſy, uſually ſucceeding an apoplexy. See PALSY.

PARASELENE, in phyſiology, a mock moon, a meteor, or phænomenon, encompaſſing or adjacent to the moon, in form of a luminous ring; wherein are obſerved one, ſometimes two, apparent images of the moon.

The paraſelenes are formed after the ſame manner as the parhelia, or mock ſuns. See the article PARHELIUM.

PARASITE, παρασιτος, among the Greeks, was originally a very reputable title; the paraſites being a kind of prieſts (at leaſt miniſters) of the gods, in the ſame manner as the Epulones were at Rome.

They took care of the ſacred corn, or the corn deſtined for the ſervice of the temples, and the gods, viz. ſacrifices, feaſts, &c. they had even the intendance over ſacrifices, and took care that they were duly performed. At Athens, there was a kind of college of twelve paraſites; each people of Attica furniſhing one, who was always choſen out of the beſt families.

Polybius adds, that paraſite was alſo an honourable title among the ancient Gauls, and was given to their poets; but of late, it has been made a term of reproach, and uſed for a flatterer and mean dependant.

PARASITES, or *Paraſitical Plants*, in botany, ſuch plants as are produced out of the trunks or branches of other plants, from which they receive their nouriſhment, and will not grow upon the ground; as the miſletoe, &c.

PARATHENAR, in anatomy, the name of two muſcles of the foot; one of which, the parathenar major, is a pretty long muſcle, forming a part of the outer edge of the ſole of the foot.

It is fixed backward by a fleſhy body to the outer part of the lower ſide of the os calcis, from the ſmall poſterior external tuberoſity, all the way to the anterior tuberoſity: there it joins the metatarſus, and at the baſis of the fifth metatarſal bone ſeparates from it again, and forms a tendon, which is inſerted in the outſide of the firſt phalanx of the little toe, near its baſis, and near the inſertion of the other parathenar: this laſt is called a parathenar minor; being a fleſhy muſcle fixed along the poſterior half of the fifth bone of the metatarſus, and terminating under the head of that bone in a tendon, which is inſerted in the lower part of the baſis of the firſt phalanx of the little toe.

PARATHESIS, in grammar, the ſame with appoſition. See APPOSITION.

PARATITLES, *Paratitla*, in juriſprudence, ſhort notes or ſummaries of the titles of the digeſt and code; which have been made by ſeveral lawyers, in order to compare and examine the connection of the ſeveral parts with one another. See the articles DIGEST and CODE.

PARBUNCLE, in a ſhip, the name of a rope almoſt like a pair of ſlings: it is ſeized both ends together, and then put double about any heavy thing that is to be hoiſted in or out of the ſhip; having the hook of the runner hitched into it, to hoiſe it up by.

PARCÆ, in the heathen mythology, goddeſſes, who were ſuppoſed to preſide over the accidents and events, and to determine the date or period, of human life.

PARCHMENT, in commerce, the ſkins of ſheep or goats, prepared after ſuch a manner as to render it proper to writing upon, covering books, &c.

PAREGORICS, in pharmacy, medicines that aſſuage pain, otherwiſe called anodynes. See the article ANODYNES.

PARELCON, in grammar, a figure by which a word or ſyllable is added to the end of another.

PARELIUM, or PARHELIUM. See the article PARHELIUM.

PARENCHYMA, in anatomy, a term introduced by Eraſiſtratus, ſignifying all that ſubſtance which is contained in the interſtices between the blood-veſſels of the viſcera, which he imagined to be extravaſated and concreted blood. The moderns having diſcovered all the viſcera to be vaſcular and glandulous, have rejected this term, together with the doctrine.

PARENCHYMA *of Plants*. Grew applies the term

term parenchyma to the pith or pulp, or that inner part of a fruit or plant through which the juice is ſuppoſed to be diſtributed. This, when viewed with a microſcope, appears to reſemble marrow, or rather a ſponge, being a porous, flexible, dilatable ſubſtance. Its pores are innumerable and exceedingly ſmall, receiving as much humour as is requiſite to fill and extend them, which diſpoſition of pores it is that is ſuppoſed to fit the plant for vegetation and growth.

PARENT, *Parens*, a term of relation applicable to thoſe from whom we immediately receive our being. See FATHER and MOTHER.

PARENTALIA, in antiquity, funeral obſequies, or the laſt duties paid by children to their deceaſed parents.

It is alſo uſed for a ſacrifice, or ſolemn ſervice, offered annually to the manes of the dead.

PARENTHESIS, in grammar, certain intercalary words, inſerted in a diſcourſe, which interrupt the ſenſe, or thread, but ſeem neceſſary for the better underſtanding of the ſubject.

The proper characteriſtic of a parentheſis is, that it may be either taken in or left out, the ſenſe and the grammar remaining entire. In ſpeaking, the parentheſis is to be pronounced in a different tone; and in writing, it is encloſed between ( ), called alſo a parentheſis, but commonly a bracket, or crotchet, to diſtinguiſh it from the reſt of the diſcourſe. The politeſt of our modern writers avoid all parentheſes, as keeping the mind in ſuſpenſe, embarraſſing it, and rendering the diſcourſe leſs clear, uniform, and agreeable.

The parentheſis is frequently confounded with the parembole. See the article PAREMBOLE.

PARGET, in natural hiſtory, a name given to ſeveral kinds of gypſum, or plaſter-ſtone. See PLASTER.

PARGETING, in building, is uſed for the plaſtering of walls, and ſometimes for the plaſter itſelf.

Pargeting is of various kinds, as, 1. white-lime, hair, and mortar, laid upon bare walls: 2. on bare laths, as in partitioning and ceiling: 3. rendering the inſides of walls, or doubling partition walls: 4. rough-caſting upon heart-laths: 5. plaſtering on brick-work, with a finiſhing mortar in imitation of ſtone-work.

PARHELIUM, or PARHELION, in phyſiology, a mock ſun or meteor in form of a very bright light appearing on one ſide of the ſun.

The parhelia are formed by the reflection of the ſun's beams on a cloud properly poſited. They uſually accompany the coronæ, or luminous circles, and are placed in the ſame circumference and at the ſame height. Their colours reſemble that of the rainbow, the red and yellow are on the ſide towards the ſun, and the blue and violet on the other. There are coronæ ſometimes ſeen without parhelia, and *vice verſa*.

Parhelia are double, triple, &c. and in 1629, a parhelion of five ſuns was ſeen at Rome; and in 1666, another at Arles of ſix.

M. Mariotte accounts for parhelia from an infinity of little particles of ice floating in the air, that multiply the image of the ſun by refraction or reflection; and by a geometrical calculus he has determined the preciſe figure of theſe little icicles, their ſituation in the air, and the ſize of the coronæ or circles which accompany the parhelia, and the colours wherewith they are painted. M. Huygens accounts for the formation of a parhelion in the ſame manner as for that of the halo. See the article HALO.

PARIETALIA OSSA, in anatomy, the ſecond and third bones of the cranium; being called alſo oſſa-bregmatis, and oſſa-ſincipitis.

PARIETES, in anatomy, a term uſed for the incloſures or membranes, that ſtop up or cloſe the hollow parts of a body, eſpecially thoſe of the heart, thorax, &c.

PARIETARIA, PELLITORY OF THE WALL, in botany, a genus of plants, producing hermaphrodite and female, apetalous flowers; the calyx of each is a monophyllous perianthium: the ſtamina are four ſubulated filaments, topped with twin antheræ; there is no pericarpium, but the ſeed, which is ſingle, and of an oval form, is contained in the cup. Pellitory flowers in May, and grows upon old walls and buildings in ſeveral parts of England.

This plant is very famous in the materia medica as cooling and abſtergent. It is preſcribed in ſtranguries, and in caſes of gravel, or ſmall ſtones in the kidneys, and is an ingredient in decoctions for clyſters to be given in nephritic caſes. Externally, it is much recommended in the eryſipelas, and for the ſoftening of hard tumours.

PARIS, herb true-love, in botany, a plant producing cruciform flowers: the fruit is a globoſe berry, containing four cells, which are filled with ſeeds arranged in a double ſeries. This plant grows wild in moiſt ſhady woods in many parts of England.

PARISH, the precinct of a parochial church, or a circuit of ground inhabited by people who belong to one church, and are under the particular charge of its miniſter.

A pariſh may contain ſeveral villages within its limits, though in general it is accounted to contain no more than one, except the contrary be made to appear: and an antient village, which time out of mind has had a church of its own, and choſen overſeers, &c. may be a pariſh in reputation, ſo as to provide for its own poor only, and be excuſed from contributing to the poor of the pariſh in which it lies, 43 Eliz. c. 2.

In England there are nine thouſand, nine hundred and thirteen pariſhes, of which three thou-

ſand, eight hundred and forty-five are churches impropriate, and the reſt are annexed to colleges, or church dignities. In many of theſe pariſhes, on account of their large extent, and the number of pariſhioners, there are ſeveral chapels of eaſe.

PARISH-OFFICERS, officers choſen annually to regulate and manage the concerns of the pariſh, for which ſee the articles CHURCH-WARDENS, and OVERSEERS *of the Poor*.

PARK, a large incloſure privileged for wild beaſts of chace, either by preſcription or the king's grant. No perſon can now erect a park without his obtaining firſt a licence under the broad-ſeal; but there may be ſuch in reputation, though erected without lawful warrant, and the owner may bring his action againſt perſons that kill his deer therein. The pulling down walls, or pales, makes the offenders liable to the ſame penalty as for killing of deer.

PARK, is alſo uſed for a moveable incloſure, or fold, ſet up in the fields for ſheep to feed and reſt in during the night. This park is frequently removed by the ſhepherds to dung the ground one part after another.

PARK, alſo ſignifies a large net, placed on the brink of the ſea, with only one entrance, which is next to the ſhore, and which is left dry by the ebb of the tide, ſo that the fiſh once got in, have no way left to eſcape.

PARK *of Artillery*. See the article ARTILLERY-PARK.

PARK *of Proviſions*. See the article *Park of* PROVISIONS.

PARKINSONIA, in botany, a genus of plants, whoſe flower conſiſts of five almoſt equal ſpreading petals; the ſtamina are ten declining filaments, terminated by oblong incumbent antheræ. The fruit is a long taper pod, with ſwelling joints, each articulation containing an oblong ſeed.

This plant grows naturally in the Spaniſh Weſt-Indies, where it riſes to the height of twenty feet or upwards: it bears long ſlender bunches of yellow flowers, which are pendent; they have a moſt agreeable ſcent, ſo as to perfume the air to a conſiderable diſtance; for which reaſon the inhabitants of the Weſt-Indies plant them near their habitations. It is propagated from ſeeds; but in this climate requires a ſtove to preſerve it.

PARLEY, a conference with an enemy. Hence to beat or ſound a parley, is to give a ſignal for holding ſuch a conference by beat of drum or ſound of trumpet.

PARLIAMENT, is the grand aſſembly of the three ſtates of this kingdom, ſummoned together, by the king's authority, to conſult of matters relating to the public welfare, and particularly to enact and repeal laws. It conſiſts of the king, the lords ſpiritual and temporal, and the commons, and is at once the ſeat of the legiſlative authority, and the higheſt court of juſtice in Great-Britain. In the houſe of lords, criminal cauſes are tried on the impeachment of the commons; and this houſe has an original juriſdiction for the trial of peers upon indictments found by a grand jury; the lords likewiſe try ſuch cauſes as come thither on appeals from the court of chancery, and all their decrees are as judgments. The houſe of commons examine the rights of elections, regulate diſputes concerning them, may expel their own members, and commit them to priſon; they are the grand inqueſt of the nation, and preſent public grievances or delinquents to the king and lords, in order to their being puniſhed. In ſhort, they are the repreſentatives of all the commons in the kingdom, and in them their conſtituents have placed the higheſt confidence, by inveſting them with the power of making laws, and entruſting them with all their liberties and privileges. Originally, new parliaments were called every year; but by degrees their term grew longer. In the reign of king Charles II. they were held a long time, with great interruptions between: but both methods were found of ſuch ill conſequence, that, in the beginning of the reign of king William III. an act paſſed, by which the term of all parliaments was reſtrained to three ſeſſions, or three years; this was hence called the triennial act: but ſince that time, from other views, the period of parliaments has been lengthened to ſeven years.

PARLOUR, a fair lower room, deſigned principally for the entertainment of company. See APARTMENT.

PARNASSIA, in botany, a genus of plants, whoſe flower has five roundiſh, emarginated, ſtriated, concave, patent petals, with five cordated nectariums, and the ſame number of ſubulated filaments, terminated with depreſſed incumbent antheræ. The fruit is an oval four-cornered capſule, with one cell, containing a number of oblong ſeeds.

PAROCHIAL, ſomething belonging to a pariſh. See PARISH, CHURCH, &.

PARODICAL *Degrees of an Equation*, in algebra, are the ſeveral regular terms in quadratic, cubic, biquadric equations, &c. the indexes of whoſe powers aſcend or deſcend orderly in an arithmetical progreſs, as $z^3 + z^2 m + zr = s$, is a cubical equation, where no term is wanting, but having all its parodic degrees, the indexes of the terms regularly deſcending thus, 3, 2, 1, 0.

PARODY, παρωδία, a popular maxim, adage, or proverb.

Parody is alſo a poetical pleaſantry, conſiſting in applying the verſes written on one ſubject, by way of ridicule to another; or in turning a ſerious work into a burleſque, by affecting to obſerve, as nearly as poſſible, the ſame rhymes, words, and cadences.

It

It comes near to what ſome of our late writers call traveſty; and was firſt ſet on foot by the Greeks, from whom we borrow the name.

PAROL, or PAROLE, in law, is uſed for a plea in court: ſometimes this word is joined with the term leaſe; thus leaſe-parol denotes a leaſe by word of mouth, in order to diſtinguiſh it from a leaſe in writing.

PARONYCHIA, whitlow, in medicine, an inflammatory and exceeding painful diſorder, which inveſts all the joints, and particularly the ends of the fingers; being generally much ſwelled with a beating or throbbing, and intenſe heat. There is ſometimes little or no tumour obſerved, when the diſorder lies deep at, or in the bone; and ſometimes again the tumour, pain, and inflammation, are extended from the finger, up to the elbow, or even to the ſhoulder, from the communication of the fingers with thoſe parts by the flexor-muſcles.

For the cure of a paronychia, Garengeot propoſes inciſion before any trial has been made with other remedies; but Heiſter, agreeably to the advice of Hippocrates, is of opinion, that the diſorder may be frequently diſperſed and removed by the uſe of deluent, diſcutient, and cooling remedies, without any inciſion. The moſt approved method for removing an inflammation and obſtruction in this manner, is to let the patient hold his finger, for ſeveral hours, in ſpirit of wine, highly rectified, and in which has been infuſed camphor or theriaca. See the articles DISPERSION, DILUENT, DISCUTIENT, &c.

But when there is already a ſuppuration actually formed, either before or under the uſe of theſe means, then an inciſion is the only remedy. In the firſt ſpecies of this diſorder, the ſurgeon, as ſoon as he perceives the matter to point, or form a little protuberance, ought to hold and preſs it between the finger and thumb of his left hand, while he makes a longitudinal inciſion therein, with his right, by which means the matter being diſcharged, the finger will then heal almoſt of itſelf. In the ſecond ſpecies of the paronychia, an inciſion is to be made according to the preceding directions; only then more care is to be taken, that the knife penetrate to the bone: the inciſion being made, the blood ſhould be ſuffered to flow out a little while, either of itſelf, or elſe it ſhould be preſſed out; then the wound is to be dreſſed with dry lint, and diachylon plaſter, with a compreſs dipped in warm ſpirit of wine, and retained on by a proper bandage: the wound is next to be treated like thoſe in which the bones are affected, viz. with eſſence of myrrh, amber, balſam of Peru, &c.

PAROTIDES, in anatomy, two very remarkable glands, ſituated one on each ſide, between the ear and the angle of the lower jaw, and often extending themſelves over a great part of the maſſeter. From each of theſe glands there runs a very large duct, about three fingers-breadth long, and of the thickneſs of a wheat-ſtraw, having a great number of roots: this duct, from Steno, the diſcoverer, is by ſome called ductus ſalivalus Stenonius, by others ductus ſalivalus ſuperior. It paſſes over the maſſeter-muſcle, through the middle of the cheek, and there perforates the buccinator-muſcle, and the membrane of the mouth, near the ſecond or third of the dentes molares, and at this perforation it diſcharges a very large quantity of its proper fluid into the mouth. The parotides are among thoſe glands that ſerve for the ſecretion of the ſaliva. See the articles GLAND and SALIVA.

PAROTIDES is alſo the name of certain tumours or inflammations ariſing behind the ears, or the parotid glands.

PAROXISM, in medicine, the ſevere fit of a diſeaſe, under which it grows higher, or exaſperates, as of the gout, &c.

It is alſo uſed for the acceſs or return of a diſeaſe, as an ague, &c.

PARRELS, in a ſhip, are frames made of trucks, ribs, and ropes, which having both their ends faſtened to the yards, are ſo contrived, as to go round about the maſt; that the yards, by their means, may go up and down upon the maſts; theſe alſo, with the breaſt-ropes, faſten the yards to the maſts.

PARRICIDE, *Parricida*, or *Patricida*, ſtrictly ſignifies the murder or murderer of a father, as matricide does of a mother; yet this word is ordinarily taken in both ſenſes, and is alſo extended to the murder of any near relation, as huſband, wife, brother, ſiſter, child, grand-child, uncle, &c. and even to that of great or ſacred perſons, though no way allied in blood, as a king, &c.

PARROQUET, in ornithology, a ſubdiviſion of parrots. See the next article.

PARROT, *Pſittacus*, a genus of birds, of the order of the accipitres, the characters of which are theſe; the beak is of a hooked or uncinated figure; and the toes are four on each foot, two forwards and two backwards.

PARRYING, in fencing, the action of warding off the blows aimed at one by another. See the article FENCING.

PARSLEY, *Apium*, in botany, a genus of umbelliferous plants; the flower is compoſed of five pale petals, with five ſtamina; theſe are ſucceeded by ſeeds that are joined by pairs, and are ſlender, furrowed, grey, and roundiſh at the back. Parſley is cultivated in gardens for culinary purpoſes, it being more uſed in the kitchen than any other herb whatſoever; it will tolerably endure cold, but is apt to be deſtroyed in very ſevere winters, eſpecially where the land is moiſt; it is commonly ſown in the ſpring, and ſends forth a ſtalk the year after, which flowers in June or July, and the ſeeds ripen in Auguſt.

The

The common parſley is, by ſome ſkilful people, cultivated in fields for the uſe of ſheep, it being a ſovereign remedy to preſerve them from the rot, provided they are fed twice a week, for two or three hours each time, with this herb: but hares and rabbets are ſo fond of it, that they will come from a great diſtance to feed on it; ſo that whoever has a mind to have plenty of hares in their fields, by cultivating parſley, will draw all the hares off the country to them.

The leaves of parſley are cooling, and good for cleanſing the viſcera; they alſo abſterge much ſlime and viſcid adheſions from the ſtomach and bowels, cleanſe all the paſſages, keep the juices fluid, and greatly aſſiſt their diſcharge by urine. The root is one of the five opening roots; it is attenuant, aperient, detergent, and diuretic; it is good in decoctions, diet-drinks, and medicinal ales, for cleanſing the blood (as it is commonly called) and draining off ill humours by urine. The ſeed is one of the four hot ſeeds, and is ſaid to be good in the gravel and dropſy.

Macedonian PARSLEY. See the article BUBON.

PARSNEP, *Paſtinaca*, in botany, a genus of umbelliferous plants, the univerſal flower of which is uniform, and the particular ones are each compoſed of five lanceolated incurved petals, with five hairy ſtamina; there is no pericarpium, but the fruit, which is plane, elliptical, and compreſſed, is compoſed of two flattiſh marginated ſeeds.

The garden parſnep is propagated by ſowing its ſeeds in February or March, on a rich ground of a good depth, and afterwards hoed out as is practiſed with turneps, and in autumn the roots are to be dug up, and preſerved for winter and ſpring uſe: the year after ſowing, the flower-ſtalk ariſes to the height of three or four feet, and is upright, firm, furrowed, hollow, and branched; the leaves are large and compoſed of other leaves, that are villous, dentated on their edges, and winged; they are of a browniſh green, and placed by pairs along the rib, which is terminated by a ſingle leaf; the flowers are yellow, and come out in July or Auguſt, and the ſeeds are ripe about the beginning of September.

The roots of this plant are of great uſe as food, for which they are chiefly cultivated; they are more nouriſhing than carrots, though ſome people have a natural averſion to their uſe. The roots and ſeeds of wild parſnep are ſometimes uſed in medicine, and are recommended as a remedy againſt agues, and are reckoned good in flatulencies and cholics.

PARSON, the rector or incumbent of a pariſh-church. See the articles CHURCH and CLERGY.

PARSON IMPARSONEE, ſignifies one that is in poſſeſſion of a church, whether it be preſentative or or impropriate, and with whom the church is then full.

PARSONAGE, a rectory or pariſh-church, endowed with a houſe, glebe, lands, tythes, &c. for the maintenance of a miniſter, with cure of ſouls within ſuch pariſh. There may, notwithſtanding, be a parſonage without either glebe or tythes, but only annual payments inſtead thereof.

PART, *Pars*, a portion of ſome whole, conſidered as divided or diviſible.

Conſent of PARTS, in medicine. See the article CONSENT.

PART, in geography and aſtronomy, is applied to the diviſion of lines and circles, &c.

Aliquot PART, and *Aliquant* PART, in arithmetic. See the articles ALIQUOT and ALIQUANT.

Proportional PART, is a part or number agreeable or analogous to ſome other part or number; or a medium to find ſome number or part unknown, by proportion and equality of reaſon.

Similar PARTS, are thoſe which are to one another, as their wholes are to one another.

PART, in muſic, denotes a piece of the ſcore, or partition, written by itſelf, for the conveniency of the muſician; or, it is one or more of the ſucceſſions of ſounds, which make the harmony, written apart. Or, the parts are the ſounds made by ſeveral perſons, ſinging or playing in concert.

Muſic in parts was unknown to the ancients; they had but one part: all their harmony conſiſted in the ſucceſſion of notes, none in the conſonance.

There are four principal parts, the treble, baſe, tenor, and counter-tenor. Some compare the four parts in muſic to the four elements; the baſe, they ſay, repreſents the earth; the tenor, the water; counter-tenor, air; and treble, fire.

PARTS *of Speech*, in grammar, are all the ſorts of words which enter the compoſition of diſcourſe. See SPEECH.

The grammarians generally admit of eight parts of ſpeech, viz. noun, pronoun, verb, participle, adverb, prepoſition, interjection, and conjunction. See NOUN, PRONOUN, &c.

PARTERRE, in gardening, a level diviſion of ground, which, for the moſt part, faces the ſouth and beſt front of the houſe; and is generally furniſhed with greens, flowers, &c.

There are ſeveral ſorts of parterres, as plain graſs with borders, and parterres of embroidery, &c.

Plain parterres are more beautiful in England than in any other country, by reaſon of the excellency of our turf, and that decency and unaffected ſimplicity that it affords to the eye of the ſpectator. Other parterres are cut into ſhell and ſcroll work, with ſand-alleys between them; which ſort of parterres are eſteemed fineſt in France.

As to the general proportions of parterres, an oblong, or long-ſquare, is eſteemed the beſt: therefore, a parterre ſhould not be leſs than twice as long as it is broad; twice and a half is accounted a very good

good proportion; and it is very rare that three times is exceeded. As to the breadth of a parterre, it is to take its dimenſions from the breadth of the front of the houſe; if the front of the houſe is one hundred feet long, the breadth of the parterre ſhould be one hundred and fifty feet; and if the front of the houſe be two hundred feet, the parterre ſhould be fifty feet broader: but where the front exceeds the breadth of this parterre, it will be a good proportion to make the parterre of the ſame dimenſions with the front.

There ſhould be a terrace-walk on each ſide of the parterre, for an elevation proper for view; and therefore, there ſhould never be the flat of a parterre between terrace-walk and terrace-walk, above three hundred feet; nor can it be well made leſs than one hundred and forty. As to the adorning and furniſhing theſe parterres, whether it be plain or with embroidery, that depends much upon the form of them, and therefore muſt be left to the judgment and fancy of the deſigner.

PARTHENIUM, American-feverfew, in botany, a genus of plants, the compound flower of which is convex; there are ſeveral corollulæ in the diſc, which are monopetalous, tubuloſe, ligulated, erect, quinquifid at the mouth, and of the length of the cup; the female flowers are alſo monopetalous, but they are tubulated, ligulated, oblique, obtuſe, roundiſh, and of the length of the hermaphrodite ones; they are five in number, and are placed in the verge or radius: there is no other fruit but the cup, which remains upon the plant unaltered: the ſeeds in the hermaphrodite flowers are abortive; and in the female it remains in the cup, and is ſingle, of a turbinato-cordated form, compreſſed, and naked.

The leaves and flowers of this plant are recommended in frigid and flatulent affections of the uterus, in obſtructions of the menſes, in venereal weakneſſes, and in the dropſy. They are alſo of great uſe in putrid fevers, the ſtone in the kidneys, vertigo, and arthritis.

PARTI, PARTIE, PARTY, or PARTED, in heraldry, is applied to a ſhield or eſcutcheon, denoting it divided or marked out into partitions. See the articles SHIELD, &c.

PARTI *per Pale*, is when the ſhield is divided perpendicularly into two halves, by a cut in the middle from top to bottom.

PARTI *per Feſs*, is when the cut is acroſs the middle, from ſide to ſide.

PARTI *per Bend Dexter*, is when the cut comes from the upper corner of the ſhield, on the right hand, and deſcends athwart to the oppoſite lower corner.

PARTI *per Bend Sinifter*, is when the cut, coming from the upper left corner, deſcends acroſs to the oppoſite lower one.

From theſe four partitions have proceeded an infinite number of others, of various and extravagant forms.

PARTICIPATION, that which gives a part or ſhare in any thing, either by right or grace.

PARTICIPLE, *Participium*, in grammar, an adjective formed of a verb, ſo called becauſe it participates partly of the properties of a noun, and partly of thoſe of a verb; being variable through genders and caſes, like the former; and regarding time, action, paſſion, &c. in manner of the latter. See NOUN and VERB.

In our language, the participles and gerunds are not at all diſtinguiſhable. See GERUND.

PARTICLE, in phyſiology, the minute part of a body, an aſſemblage of which conſtitute all natural bodies. See ATOM and MATTER.

It is the various arrangement and texture of theſe particles, with the difference of coheſion, &c. that conſtitute the various kinds of bodies. The ſmalleſt particles cohere with the ſtrongeſt attraction, and compoſe bigger particles of weaker coheſion, and many of theſe cohering compoſe bigger particles, whoſe vigour is ſtill weaker; and hereupon the operations in chemiſtry, and the colours of natural bodies depend, and which, by cohering, compoſe bodies of ſenſible bulk.

The coheſion of the particles of matter, the Epicureans imagined, was affected by means of hooked atoms; the Ariſtotelians, by reſt; but Sir Iſaac Newton ſhews, that it is done by means of a certain power, whereby the particles mutually attract and tend towards each other. By this attraction of the particles, he ſhews, that moſt of the phænomena of the leſſer bodies are affected, as thoſe of the heavenly bodies are, by the attraction of gravity. See ATTRACTION and GRAVITATION.

PARTICLE, in grammar, a denomination for all thoſe ſmall words that tie or unite others together, or that expreſs the modes or manners of words, uſually included, by grammarians, under theſe four parts of ſpeech, viz. adverbs, prepoſitions, interjections, and conjunctions. See the articles PARTS *of Speech*, ADVERB, &c.

PARTIES, in law, ſignify the perſons that are named in a deed or fine, viz. thoſe that made the deed, or levied the fine, and alſo thoſe to whom the ſame was made or levied.

PARTING, or DEPARTING, a method of ſeparating gold and ſilver, by means of aqua-fortis; for the operation of which, ſee ASSAYING and QUARTATION.

PARTITION, in law, ſignifies a diviſion of lands, &c. deſcended by common law or cuſtom among coheirs or parceners, being two at leaſt. Partition may alſo be made by joint tenants, and tenants in common by aſſent, deed, or writ. See CO-PARCENERS.

PARTNER, and PARTNERSHIP. See the article FELLOWSHIP.

PARTRIDGE, in ornithology, is a ſpecies of tetrao, with a naked ſcarlet mark behind the eyes.

The common partridge is too well known to need a farther deſcription: it is common in fields, and called by authors perdix. But beſides the common kind, there is another ſomewhat larger ſpecies, called the red-legged partridge, with a grey tail, variegated in the upper part with brown.

PARTURITION, the ſame with delivery. See DELIVERY.

PARULIDES, in ſurgery, tumours and inflammations of the gums, commonly called gum-boils.

They are to be treated with diſcutients, like other inflammatory tumours. Sage, camomile, and elder-flowers, boiled in milk or water, make a gargariſm to be held in the mouth warm; and the remaining herbs may be ſewed up in a bag, and applied hot to the cheeks. See the article DISPERSION.

But if the diſorder cannot be thus diſperſed, emollient applications of mallows, &c. are good; and to forward the matturation externally, a half-roaſted fig may be applied: and when the ſoftneſs of the tumour ſhews that the matter is ſuppurated, it ought immediately to be opened by the lancet, to prevent the matters lodging there, and eroding the bone, and producing a fiſtula or caries. After it is opened, the matter ſhould be gently preſſed out with the fingers, and the mouth frequently waſhed with red wine, mixed with a decoction of vulnerary herbs, till it is well.

When the ulcer has penetrated deep, it will be neceſſary to inject the ſame liquors with a ſyringe, and compreſs the part by a proper external bandage, to make the bottom heal firſt; and when it is already become fiſtulous, and has callous edges, it may then often be cured by injecting tincture of myrrh, and elixir proprietatis, continuing this for ſome time. If all theſe prove ineffectual, the fiſtula muſt be laid open by inciſion, and the caries removed by medicines, cauſtics, or the actual cautery. If this proceeds, as ſometimes it does, from a carious tooth, this is firſt of all to be extracted, otherwiſe the tumour will degenerate into a fiſtula: and it is always beſt to be early in making the inciſion.

PASPALUM, in botany, a genus of plants, whoſe flower is a bivalvular glume, with three capillary filaments, topped with ovate antheræ: the fruit is a perſiſtent glume, in which is placed one roundiſh compreſſed ſeed.

PASQUE. See PULSATILLA.

PASQUIN, a mutilated ſtatue at Rome, in the corner of the palace of the Urſini.

It takes its name from a cobler of that city, called Paſquin, famous for his ſneers and gibes, and who diverted himſelf with paſſing his jokes on all the people who went through the ſtreet. After his death, as they were digging up the pavement before his ſhop, they found in the earth the ſtatue of an ancient gladiator, well cut, but maimed, and half ſpoiled; this they ſet up in the place where it was found, and by common conſent named it Paſquin. Since that time, all ſatires are attributed to that figure, and are either put into its mouth or paſted upon it, as if they were wrote by Paſquin redivivus; and theſe are addreſſed by Paſquin to Marforio, another ſtatue at Rome. When Marforio is attacked, Paſquin comes to his aſſiſtance; and when Paſquin is attacked, Marforio aſſiſts him in his turn.

PASQUINADE, a ſatirical libel faſtened to the ſtatue of Paſquin: theſe are commonly ſhort, merry, and pointed; and hence the term has been applied to all other lampoons of the ſame caſt.

The difference between a paſquinade and a ſatire is, that the end of the latter is to correct and reform, while that of the former is only to ridicule and expoſe.

PASS, a ſtraight, difficult, and narrow paſſage, which ſhuts up the entrance into a country.

The firſt care of the general of an army is to ſeize the paſſes of the country into which he would carry the war, to fortify them, and take care that they are well guarded.

PASS *of Arms*, in chivalry, a bridge, road, &c. which the ancient knights undertook to defend.

PASS, or PASSADE, in fencing, an advance or leap forward upon the enemy.

PASSADE, in the manege, is a turn or courſe of a horſe backwards or forwards, on the ſame ſpot of ground.

PASSAGE, in the manege, is a horſe's walking or trotting in ſuch a manner that he raiſes the outward hind-leg, and the inward fore leg together; and ſetting theſe two on the ground, raiſes the other two alternately, never gaining above a foot of ground at a time.

PASSAGE, or PASSO, in muſic, a part of an air or tune, conſiſting of ſeveral ſhort notes, as quavers, ſemi-quavers, &c. laſting one, two, or, at moſt, three meaſures, in the beginning of a piece, which is to be afterwards imitated in the other notes of the piece, not with the ſame chords or notes, but only by obſerving the ſame motion, number, and figure, as in the notes of the firſt paſſage. This is called by the Italians, contrapunto d'un ſol paſſo.

Birds of PASSAGE, a name given to thoſe birds which, at certain ſtated ſeaſons of the year, remove from certain countries, and at other ſtated times return to them again, as our quails, woodcocks, ſtorks, nightingales, ſwallows, and many other ſpecies.

Right of PASSAGE, in commerce, is an impoſition or duty exacted by ſome princes, either by land or ſea, in certain cloſe and narrow places in their territories, on all veſſels and carriages, and even ſometimes on perſons or paſſengers, coming in or going out of ports, &c.

The moſt celebrated paſſage of this kind in Europe

rope is the Sound, the dues for paſſing which ſtrait belong to the king of Denmark, and are paid at Elſenore or Cronenburg.

PASSANT, in heraldry, a term applied to a lion or other animal, in a ſhield, appearing to walk leiſurely. For moſt beaſts, except lions, the term trippant is frequently uſed inſtead of paſſant.

PASSERES, the name of a claſs of birds with a conic and much attenuated beak. See the article ORNITHOLOGY.

PASSERINA, ſparrow-wort, in botany, a genus of plants, whoſe flower is monopetalous, the tube whereof is ſlender, narrow, and ſwelling in the middle; the limb is patent, and divided into four ſegments: the ſtamina are eight ſetaceous filaments, topped with erect antheræ; and the fruit is an oval, coriaceous, unilocular capſule, containing a ſingle ovate ſeed, pointed at both ends.

PASSIFLORA, the paſſion-flower, in botany, a genus of plants, whoſe flower-cup is formed of five plane coloured leaves; the corolla conſiſts of five ſemi-lanceolated obtuſe petals; the nectarium hath a triple crown, the exterior of which is longer, and faſtened to the inſide of the petal, but is larger and compreſſed above: the ſtamina are five ſubulated filaments, faſtened at their baſe to the column of the ſtyle, annexed to the germen, ſpreading out, and terminated by oblong, obtuſe, incumbent antheræ: the fruit is an ovate, fleſhy, unilocular berry, ſupported on a pedicle, and contains a number of ovate ſeeds, faſtened longitudinally to the bark of the pericarpium.

The common paſſion-flower hath long ſlender ſtalks, which run a great length, and require ſupport; they are covered with a purpliſh bark, and are furniſhed at each joint with a digitated leaf, compoſed of five ſmooth entire lobes, connected with the ſtalk by pedicles, about two inches long, having two ſmall leaves embracing the ſtalks at their baſe; and from the ſame point comes out a long tendril, which twiſts round the neighbouring ſupport; the flowers come out at the ſame joints as the leaves, ſupported on foot-ſtalks almoſt three inches long; theſe flowers have a faint ſmell, and continue but one day; they come out in July, and there is a diurnal ſucceſſion till the froſt in autumn puts a ſtop to them.

This plant may be propagated either from ſeeds, layers, or cuttings; they require a good aſpected wall; where they may have height for their ſhoots to extend, which ſhould be properly trained againſt it; and in the ſpring the plants muſt be pruned, when all the ſmall weak ſhoots ſhould be cut off, and the ſtrong ones ſhortened to about four or five feet long, which will cauſe them to put out ſtrong ſhoots for flowering the following ſummer.

PASSION-FLOWER, *Paſſiflora*, in botany. See the article PASSIFLORA.

PASSIONS, in moral philoſophy, are certain motions of the ſoul, which makes it purſue what appears to be good, and avoid whatever threatens evil. See the articles GOOD and EVIL.

PASSIONS, in medicine, make one of the non-naturals, and produce very ſenſible effects. Joy, anger, and fear, are the principal. In the two firſt, the ſpirits are hurried with too great vivacity; whereas, in fear or dread, they are as it were curbed and concentrated: whence we may conclude, that they have a very bad effect upon health; and therefore, it will be beſt to keep them within bounds as much as poſſible, and to preſerve an inward ſerenity, calmneſs, and tranquility.

Continual ſorrow and anguiſh of mind, render the fluids thick, and generate viſcid and acid crudities in the ſtomach, and at length render the body unapt for a due circulation; whence proceed obſtructions of the viſcera, and many chronical diſorders.

Anger conſtringes the bilious veſſels in particular, and cauſes too great an evacuation of the bile, produces ſtrictures in the ſtomach and duodenum; whence the bilious humours are amaſſed and corrupted; laying a foundation for vomiting, billious fevers, and cardialgiæ.

PASSIONS, in painting, are the external expreſſions of the different diſpoſitions and affections of the mind; but particularly their different effects upon the ſeveral features of the face: for though the arms, and indeed every part of the body, ſerve likewiſe, by their quick, languid, and variouſly diverſified motions, to expreſs the paſſions of the ſoul; yet, in painting, their difference is moſt conſpicuous in the face.

PASSIONS, in poetry, are of ſingular uſe in diſtinguiſhing the characters of the actors. See the article CHARACTER.

PASSION, or *Croſs of the* PASSION, in heraldry, is ſo called, becauſe reſembling the ſhape of that on which our Saviour is thought to have ſuffered; that is, not croſſed in the middle, but a little below the top, with arms ſhort in proportion to the length of the ſhaft.

PASSION-WEEK, the week immediately preceding the feſtival of Eaſter: ſo called, becauſe in that week our Saviour's paſſion and death happened.

PASSIVE, in general, denotes ſomething that ſuffers the action of another, called an agent, or active power.

PASSOVER, a ſolemn feſtival of the Jews, celebrated on the fourteenth day of the month next after the vernal equinox, and inſtituted in commemoration of their coming out of Egypt; becauſe on the night before their departure, the deſtroying angel, who put to death the firſt-born of the Egyptians, paſſed over the houſes of the Hebrews, which were ſprinkled with the blood of a lamb. The

whole

whole tranſaction is related in the twelfth chapter of Exodus.

PASS-PAROLE, a command given at the head of an army, and thence communicated to the rear by paſſing it from mouth to mouth.

PASS-PAR-TOUT, a maſter-key; or a key that opens ſeveral locks belonging to the ſame houſe or apartment.

PASS-PORT, or PASS, a licence or writing obtained from a prince or governor, granting liberty and ſafe conduct to paſs through his territories without moleſtation.

PASTBOARD, a kind of thick paper formed of ſeveral ſheets of paper paſted together.

PASTE, a compoſition of water and flower, boiled to a conſiſtence; uſed by various artificers, as ſadlers, upholdſterers, bookbinders, &c.

PASTEL, a name by which ſome call iſatis, or woad. See the article ISATIS.

PASTERN *of a Horſe*, in the manege, is the diſtance between the joint next the foot, and the coronet of the hoof. This part ſhould be ſhort, eſpecially in middle-ſized horſes, becauſe long paſterns are weak, and cannot ſo well endure travelling.

PASTERN-JOINT, the joint next a horſe's foot.

PASTIL, or PASTEL, among painters, a kind of paſte made of different colours, ground up with gum-water, in order to make crayons. See the article CRAYON.

PASTIL, in pharmacy, is a dry compoſition of ſweet-ſmelling reſins, aromatic woods, &c. ſometimes burnt to clear and ſcent the air of a chamber.

PASTINICA, the parſnep, in botany. See the article PARSNEP.

PASTOR, properly ſignifies a ſhepherd, but is now generally uſed for a parſon or miniſter that hath cure of ſouls.

PASTORAL, in general, ſomething that relates to ſhepherds; hence we ſay, paſtoral life, manners, poetry, &c.

The original of poetry is aſcribed to that age which ſucceeded the creation of the world: and as the keeping of flocks ſeems to have been the firſt employment of mankind, the moſt antient ſort of poetry was, probably, paſtoral. It is natural to imagine, that the leiſure of thoſe antient ſhepherds admitting and inviting ſome diverſion, none was ſo proper to that ſolitary and ſedentary life as ſinging; and that in their ſongs they took occaſion to celebrate their own felicity. From hence a poem was invented, and afterwards improved to a perfect image of that happy time; which, by giving us an eſteem for the virtues of a former age, might recommend them to the preſent. And ſince the life of ſhepherds was attended with more tranquility than any other rural employments, the poets chuſe to introduce their perſons, from whom it received the name of paſtoral.

PASTORAL COLUMN. See COLUMN.

PASTORAL STAFF, the ſame with croſier. See the article CROSIER.

PASTRY, that branch of cookery, which is chiefly taken up in making pies, paſties, cakes, &c.

PASTURE, or PASTURE-LAND, that reſerved for feeding cattle.

Paſture-land is of ſuch advantage to huſbandry that many prefer it even to corn-land, becauſe of the ſmall hazard and labour that attends it, and as it lays the foundation for moſt of the profit that is expected from the arable land, becauſe of the manure the cattle afford which are fed upon it. Where dung is not to be bought, as is often the caſe in places diſtant from large towns, the farmer is forced to proportion his arable to his paſture land, in ſuch manner, that the cattle fed on the latter may be ſufficient for a ſupply of dung, ſo neceſſary for producing the fruits of the former.

Paſture-lands are of three kinds: 1. The uplands: theſe lie ſo high as not to be overflowed by rivers, or land-floods. 2. Thoſe low lands which lie near rivers and fens. And, 3. Thoſe that lie near the ſea. See the articles UPLAND, MARSH-LAND, &c.

Paſture-land requires the refreſhment of dung, as well as the arable or corn-land; but there is to be a difference made in the laying it on and ſpreading it. A harrow performs the office of ſpreading the dung on ploughed lands; but the beſt contrivance for paſtures is, to lay the dung in ſmall heaps, and draw over it a gate ſtuck full of buſhes. All dung that is laid on paſture-land, muſt be laid on in winter, that the rain may waſh its fatneſs into the ground before the ſun ſcorches it, or evaporates its goodneſs. Fine mould mixed with the dung, and ſpread with it over the land, is very good for paſtures; for it is waſhed down to the very roots of the graſs, and gives them a new and fine ſoil in thoſe places where it is moſt wanted.

The beſt manure for paſture-land is the rotten bottoms of old hay-ſtacks; for theſe moulder away into a very rich ſoil, and are always full of vaſt quantities of ſeed, fallen at times from the hay, which all grow when ſpread on the ground: and thus new nouriſhment, and a new ſet of plants are given at once to the exhauſted ground. But as particularly uſeful as this is for paſture-ground, it is as improper for corn-land, and ſhould by no means ever be ſuffered to mix with the manure for thoſe grounds; as it will then raiſe graſs and other plants, which though of uſe in the paſture are weeds among the corn.

Admeaſurement of PASTURE. See the article ADMEASUREMENT.

PASTURE *of Plants*, a term uſed by Tull, for the nouriſhment they draw from the earth. See the articles PLANT and VEGETATION.

PASTY, in cookery, a preparation of veniſon,

veal, lamb, or other meat; which being well boned, beaten to a pulp, and highly ſeaſoned, is incloſed in a proper paſte, and baked in an oven.

PATAGONULA, in botany, a genus of plants, whoſe flower-cup is a ſmall, perſiſtent, quinquedentated perianthium; the corolla is monopetalous and wheel-ſhaped, with ſcarce any tube; the limb is plane, and divided into five ovate acute ſegments. The fruit is an ovate acuminated capſule, containing a number of roundiſh ſeeds.

PATAVINITY, *Patavinitas*, among critics, denotes a peculiarity of Livy's diction, derived from Patavium, or Padua, the place of his nativity; but wherein this pavinity conſiſts, they are by no means agreed.

PATE'E, or PATTE'E, in heraldry, a croſs ſmall in the center, and widening to the extremes, which are very broad.

PATELLA, in anatomy, a bone which covers the fore-part of the joint of the knee, called alſo rotula, and popularly the knee-pan. The patella is convex on the outſide, and on the inſide unequal, having an eminence and two depreſſions. Its ſubſtance is ſpungeous, and conſequently it is brittle: it is connected by tendons and ligaments to the tibia and the os femoris, which is the ligament by which it is connected to the thigh, and has a motion of aſcent and deſcent in the flexion of the tibia. In infants and children it is cartilaginous.

PATENT, in general, denotes ſomething that ſtands open or expanded: thus a leaf is ſaid to be patent when it ſtands almoſt at right angles with the ſtalk.

PATENT, or LETTERS PATENT. See the article LETTER.

PATENTEE, a perſon to whom the king has granted his letters-patent.

PATER PATRATUS, in Roman antiquity, the principal perſon among the feciales or college of heralds. See the article FECIALES.

PATER-NOSTER, the Lord's prayer, ſo called from the two firſt words in Latin. It is alſo ſometimes uſed for a chaplet or ſtring of beads. And, in architecture, the ſame term is uſed for a ſort of ornament cut in the form of beads, either oval or round, uſed on aſtragals, baguettes, &c.

PATH, in general, denotes the courſe or tract marked out to run over, by a body in motion. See MOTION.

PATH *of the Vertex*, a term frequently uſed by Mr. Flamſtead, in his doctrine of the ſphere, for a circle deſcribed by any point of the earth's ſurface, as the earth turns round its axis.

The ſemi-diameter of this path is always equal to the ſine of the complement of the latitude of the point that deſcribes it.

PATHETIC, whatever relates to the paſſions, or that is proper to excite or awake them.

PATHETIC *Nerves*, in anatomy, a pair of very ſmall nerves which ariſe in the brain, and run to the trochlear muſcle of the eye. Theſe nerves have obtained the name pathetic, from their ſerving to move the eyes in the various paſſions.

PATHOGNOMONIC, παθογνομονικος, among phyſicians, an appellation for a ſymptom, or concourſe of ſymptoms, that are inſeparable from a diſtemper, and are found in that only, and no other.

PATHOLOGY, that part of medicine, which explains the nature of diſeaſes, their cauſes and ſymptoms.

PATHOS, παθος, a Greek term, literally ſignifying paſſion, is ſometimes uſed for the energy of a diſcourſe, or its power to move the paſſions.

PATIENT, among phyſicians, a perſon under the direction of a phyſician or ſurgeon, in order to be cured of ſome diſeaſe.

PATANCE, in heraldry, is a croſs flory at the ends; from which it differs only in this, that the ends, inſtead of turning down like a fleur-de-lis, are extended ſomewhat in the pattee-form.

PATRICIAN, among the antient Romans, a title given to the deſcendants of the hundred, or, according to others, of the two hundred firſt ſenators choſen by Romulus, and by him called patres, fathers.

PATRIPASSIANS, *Patripaſſiani*, in church-hiſtory, a Chriſtian ſect, who appeared about the latter end of the IId century; ſo called from their aſcribing the paſſion to the father: for they aſſerted the unity of God in ſuch a manner as to deſtroy all diſtinction of perſons, and to make the Father and Son preciſely the ſame; in which they were followed by the Sabellians, and others. The author and head of the patripaſſians was Praxeas, a philoſopher of Phrygia in Aſia.

PATROL, in war, a round or march made by the guards, or watch, in the night-time, to obſerve what paſſes in the ſtreets, and to ſecure the peace and tranquility of a city or camp. The patrol generally conſiſts of a body of five or ſix men, detached from a body on guard, and commanded by a ſergeant.

PATRON, among the Romans, was an appellation given to a maſter who had freed his ſlave.

Patron was alſo a name which the people of Rome gave to ſome great man, under whoſe protection they uſually put themſelves.

PATRON, in the canon and common law, is a perſon, who having the advowſon of a parſonage, vicarage, or the like ſpiritual promotion, belonging to his manor, hath, on that account, the gift and diſpoſition of the benefice, and may preſent to it whenever it becomes vacant.

PATRONAGE, the right of diſpoſing of a church or benefice, and enjoying ſeveral other privileges, ſuch as having the honourable rights of the church, being interred in the chancel, &c.

PATRONYMIC, among grammarians, is ap-

plied to ſuch names of men or women as are derived from thoſe of parents or anceſtors.

PAVEMENT, a layer of ſtone, or other matter, ſerving to cover and ſtrengthen the ground of divers places for the more commodious walking on.

Moſaic PAVEMENT. See MOSAIC-WORK.

PAVETTA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is long, narrow, and cylindrical, with a patent border cut into four ſegments; the filaments are four, and very ſhort; theſe are topped with linear, ſpreading antheræ. The fruit is a roundiſh unilocular berry, containing a roundiſh cartilaginous ſeed.

PAVIA, the ſcarlet horſe-cheſnut, in botany, a plant which grows to the height of eight or ten feet, having a thick woody ſtalk, from which proceeds ſeveral ſpreading branches; theſe are furniſhed with digitated leaves, compoſed of five or ſix ſpear-ſhaped lobes, which join at the footſtalk; they are of a light green, the ſurface rough and ſerrated on their edges; they have long footſtalks, and ſtand oppoſite by pairs: the flowers come out in July, in looſe ſpikes at the ends of the branches, ſtanding upon long naked footſtalks, which ſuſtain five or ſix flowers, which are tubulous at bottom, but ſpread open at top, where the petals are irregular in ſize and length, having the appearance of a labiated flower; they are of a bright red colour, and have ſeven or eight ſtamina the length of the petals: when the flowers fade, the germen ſwells to a pear-ſhaped fruit, with a thick ruſſet cover, having three cells, one of which, and ſometimes two, are pregnant with globular ſeeds.

This plant grows naturally in Carolina, and is propagated by ſowing its ſeeds, or by budding, or grafting it upon the common horſe-cheſnut.

PAVICULA, among the Romans, a rammer or inſtrument for beating down or levelling a ſpot of ground, conſiſting of a block of wood, a foot long and half a foot thick, with a long handle.

PAVILION, in architecture, ſignifies a kind of turret or building, uſually inſulated, and contained under a ſingle roof; ſometimes ſquare, and ſometimes in form of a dome: thus called from the reſemblance of its roof to a tent.

Pavilions are ſometimes alſo projecting pieces, in the front of a building, marking the middle thereof; ſometimes the pavilion flanks a corner, in which caſe it is called an angular pavilion. The Louvre is flanked with four pavilions: the pavilions are uſually higher than the reſt of the building. There are pavilions built in gardens, commonly called ſummer-houſes, pleaſure-houſes, &c. Some caſtles or forts conſiſt only of a ſingle pavilion.

PAVILION, in military affairs, ſignifies a tent raiſed on poſts, to lodge under in ſummer timer. See the article TENT.

PAVILION, in heraldry, denotes a covering in form of a tent, which inveſts or wraps up the armories of divers kings and ſovereigns, depending only on God and their ſword.

PAVILIONS, among jewellers, the underſides and corners of the brilliants, lying between the girdle and the collet.

PAULIONISTS, in church-hiſtory, Chriſtian heretics of the third century, diſciples of Paul Samoſatenſis, biſhop of Antioch, who denied Chriſt's divinity, maintaining that when we call him the Son of God, we do not thereby mean that he is really and truly God; but only that he was ſo perfect a man, and ſo ſuperior in virtue to all others, that he has this name given him by way of eminence. The paulioniſts continued to the Vth century, notwithſtanding the prohibition of the emperor Conſtantine the great, who forbad them and other heretics to hold public aſſemblies.

PAULICIANS, Chriſtian heretics of the VIIth century, diſciples of one Conſtantine, a native of Armenia, and a favourer of the errors of Manes; who, as the name Manichees was become odious to all nations, gave thoſe of his ſect the title of Paulicians, on pretence that they followed only the doctrine of St. Paul. One of their moſt deteſtable maxims was, not to give alms to the poor, that they might not contribute to the ſupport of creatures, who were the works of the bad god. See the article MANICHEES.

PAULLINIA, in botany, a genus of plants, the corolla of which conſiſts of four oval oblong petals, double the ſize of the cup, with two nectaria inſerted into the ungues of the petals; the ſtamina are eight ſhort filaments, topped with ſmall antheræ; the fruit is a large three cornered capſule, with three cells, each containing an ovate ſeed.

This genus includes the ſerjana, and cururu of Plumier.

PAUNCH, PANTCH, or PANCH, on board a ſhip, are broad clouts, woven of thrums and ſinnets together, to ſave things from galling and fretting; therefore they are made faſt to the main and fore-yards for that purpoſe.

PAVO, in aſtronomy, a ſouthern conſtellation, called the peacock.

PAUPER, in law. See the article FORMA PAUPERIS.

PAUSE, a ſtop or ceſſation of ſpeaking, ſinging, playing, or the like. The uſe of pointing in grammar, is to make proper pauſes in certain places. There is a pauſe in the middle of each verſe; in an hemiſtich it is called a reſt or repoſe.

PAUSE, in muſic, a character of ſilence or reſt, called alſo by ſome a mute figure; becauſe it ſhews that ſome part or perſon is to be ſilent while the reſt continue the ſong.

PAW, PATTE, in heraldry, the fore foot of a beaſt, cut off ſhort. If the leg be cut off, it is called gambe. Lions-paws are much uſed in armory.

PEA, *Pisum*, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is broad heart-shaped, reflexed, emarginated, and ending in a point; the alæ are roundish, connivent, and shorter than the vexillum; the carina is compressed, semilunulated, and shorter than the alæ; the fruit is a large, long, unilocular, and bivalve pod, containing several globose seeds. The stalks of the pea plant are long, hollow, and of a sea green colour; the leaves are oblong, and of the same colour; and some are so placed that the stalks seem to run through them, while others grow by pairs on the ribs that are terminated by tendrils, which lay hold of every thing they meet with. There are several sorts of peas, which are distinguished by different names; as the golden-hot-spur, the Charlton-pea, the reading-master's and Essex hot-spurs, the dwarf-pea, the sugar-pea, the Spanish-morotto, the nonpareil, the sugar-dwarf, the sickle-pea, the marrow-fat-pea, the rose or crown-pea, the rouncival-pea, the grey-pea, &c. The propagation and use of peas, are so well known as to require no description, they being common food in all parts of England; they are very nutritive but do not agree very well with weak stomachs.

Everlasting-PEA. See EVERLASTING and LATHYRUS.

Sweet-PEA. See the article LATHYRUS.

PEACE, *pax*, in its general signification, stands in contradistinction to war. See the article WAR.

PEACE, *of the king*, is that peace or security, both of life and goods, which the king promises to all his subjects, or others under his protection.

PEACH, *Persica*, in botany, a genus of fruit-trees, classed by Linnæus, with the amygdalus or almond; but although they agree in their flowers and foilage there is a very considerable difference in their fruits; the almond having a thin, tough, coriaceous covering to the stone, which splits and falls away, leaving the stones naked; whereas the peach has a thick, moist, esculent covering to its stone, which does not separate; it may therefore be necessary in this work to mention them separately. The peach tree is said to be a native of Persia; whose extreme parts (north and south) differ about ten degrees of latitude, which difference is supposed to be the cause of their several kinds being ripe at divers seasons: that is, it is imagined, that our early peaches, were natives of the northern, and our latest of the southern parts.

This tree, in England, grows to a tolerable size; is generally trained against walls, &c. being too apt to miscarry of its fruit when planted as a standard; when grown old it has a pretty thick stem, with many brittle branches, and a reddish and brownish bark; the leaves are thin, oblong, acuminated, and for the most part crenated on their edges, having a bitter taste; the flowers appear in the beginning of the spring before the leaves, and are without pedicles, for they adhere to the tubercles of the branches, and are rosaceous, consisting each of five oblong oval petals inserted in the cup; they are of a light pink colour, and in the middle are many stamina; the flower is succeeded by a well known globular, furrowed fruit, covered with a thick soft whitish down. In England there are several sorts or varieties cultivated, as. 1. The white nutmeg peach, this is ripe in July. 2. The red nutmeg, this ripens about the beginning of August. 3. The early purple, this is ripe by the middle of August. 4. The French mignon; this is a most excellent melting peach, and ripens about the middle of August. 5. The red magdalen; this peach is ripe about the end of August. 6. The early Newington ripens the end of August. 7. The noblest, this is a fine melting peach, and ripens the end of August. 8. The chancellor, a good melting peach, and ripens the end of August. 9. The admirable; this peach parts from the stone, and ripens the beginning of September. 10. The old Newington; this peach adheres to the stone, and is reckoned one of the best sort. 11. The Portugal peach; this has a rich juice, and adheres to the stone, these ripen about the middle of September. 12. The nivette, this is a melter, and ripens in September. 13. The pavy of pomponne, is a very large fine peach, and ripens in October. 14. The Catherine, this adheres to the stone, is a high flavoured peach, and ripens in October: there are various other sorts which might be enumerated but the abovementioned being of the best and richest flavour, we think it will suffice. The French distinguish those we call peaches into two sorts, viz. pavies, and peaches; those are called peaches which separate from the stone, and those whose flesh closely adheres to the stone are called pavies; these are much more esteemed in France than the peaches, though in England the latter are preferred to the former by many persons.

The best expositions for peach trees, are the south, south-east, and south west, but they will do tolerably well on a west wall, which ripens its fruit just as those of the south are gone; they should not be planted in a cold wet soil, the fruit in such places are always watery, and insipid; the best soil for these, is fresh untried earth, which is neither too stiff nor too moist, but of a kind loamy nature; and if the earth in the borders is exhausted where the trees are intended to be planted, it should be taken away, and its place supplied with fresh; all the sorts of peaches are propagated by inoculation on plumb stocks, and trained in the nurseries for planting against walls, &c. but it is certainly best to make choice of such trees, which are of one years growth from the budding, as they will soon overtake in growth, those which are called trained trees; the best time to transplant them is in autumn, when the leaves are turned yellow, when they

they will have time to form freſh roots, before winter, and thereby be better prepared to ſhoot more vigorous in the ſpring; but the head ſhould not be cut off at that time of planting; but if the ſoil is very moiſt, it is better to plant in the ſpring, juſt as the ſap begins to be in motion: in February the tops of the trees ſhould be cut off within four or five eyes of the place of inoculation; and when the weather becomes hot and dry, it may be neceſſary to water the trees: in May the young ſhoots will have made ſome progreſs; thoſe which have a fore-right direction, ſhould be diſplaced, and the others nailed horizontally to the wall; this muſt be repeated as often as it is neceſſary: in October, the branches ſhould be ſhortened in proportion to the ſtrengh of the tree, a vigorous branch may be left nine inches or a foot long, but if the ſhoots are weak, half that length is ſufficient; obſerving to train them horizontally, as the middle of the tree will eaſily furniſh itſelf with branches: the ſecond ſummer, they are to be managed as the firſt, diſplacing all fore-right ſhoots as they are produced, and nailing in the others cloſe to the wall horizontally; but the ſhoots ſhould not be ſhortened in the ſummer, unleſs in thoſe places where there happens to be vacancies: in October, ſhorten the ſhoots as before directed, and the following years management, is much the ſame as the preceding. The time for pruning is at the abovementioned time, where the trees are planted in a dry ſoil; but if the land is moiſt, it is better to defer it till the ſpring.

When peach trees haſten to bear very ſoon, it is a ſign of decay, or weakneſs, the beſt help for them is to diſburthen the tree of its bloom, pruning it ſhort, and keeping it well watered in hot weather; but when the trees are vigorous, cut out ſuch large branches as appear to be uſeleſs, and nail in the remainder at a good length; and in making choice of ſhoots, always chooſe the middling wood as are full of ſwelling double buds, for thoſe produce fruit, which the flat ſingle ones do not, their product being wood and leaves only; the diſtance theſe trees ſhould be planted, may be about ſixteen feet: when the fruit is ſet and grown to the bigneſs of a ſmall nut, they ſhould be thinned, leaving them at leaſt five or ſix inches aſunder, for when they are permitted to remain in bunches, as they are often produced, the nouriſhment which ſhould be employed wholly to the fruits deſigned to ſtand, will be equally ſpent amongſt the whole number, a great part of which muſt be afterwards pulled off, ſo that the ſooner this is done, the better it will be for the remainder; and if it ſhould ſometimes happen, that a part of thoſe left, by any accident ſhould be deſtroyed, yet the remaining ones will be much the larger, and better flavoured for it, and the trees will gain more ſtrength; for a moderate crop of fruit, is always preferable to a great crop; for when the trees are overcharged with fruit, it is always ſmall, ill taſted, and the trees are generally ſo much weakened thereby, as not to be in a condition for bearing well for two or three years afterward: the management, &c. of nectarines being the ſame as of peaches, a repitition is therefore unneceſſary.

PEACOCK, *Pavo*, in ornithology, a genus of birds, of the order of the gallinæ, the characters of which are theſe: there are four toes on each foot, and the head is ornamented with an erect creſt of feathers.

PEAN, in heraldry, is when the field of a coat of arms is ſable, and the powderings or.

PEAR, *Pyrus*, in botany, a genus of fruit-trees, whoſe flower conſiſts of five roundiſh concave petals, which are inſerted in the cup; the fruit is of a pyramidical form, containing five membranaceous cells, each containing a ſmooth, oblong, ovato ſeed, acuminated at the baſe, convex on one ſide and plane on the other.

Pear-trees, it is ſaid, were originally brought from Alexandria, Numidia, Greece, &c. as appears by the names of ſeveral ſorts. The fruit of ſome kinds ripens in the ſummer with us, and others are not fit for uſe until winter or the ſpring.

As the ſpecies are very numerous, we ſhall only mention a few of the beſt, viz. 1. the little muſk-pear, which ripens in July; 2. the jargonelle, this is one of the beſt ſummer-pears; 3. the Windſor-pear; 4. the blanquette-pear; 5. the red orange-pear; 6. the royal-pear; 7. the ſummer-boncretien; 8. the rouſſellet; 9. the princes-pear; 10. the ſummer-bergamot; 11. the autumn-bergamot; 12. the brown-beurré; 13. the monſieur John; 14. the flowered-muſcat; 15. the green ſugar-pear; 16. la marquiſe; 17. the craſſan; 18. the colmar; 19. the vert-longue; 20. the virgoulé; 21. the winter-thorn; 22. the St. Germain; 23. the winter-rouſſelet; 24. the Eaſter-bergamot; 25. the Hollands-bergamot; 26. the winter-boncretien; 27. the Chaumontelle. (The following are baking-pears) 28. the pound-pear, or black-pear of Worceſter; 29. the winter citron-pear; 30. the francreal; 31. the double flowering-pear, with many other ſorts: they are all propagated by budding or grafting upon ſtocks of their own kind (commonly called free-ſtocks) or upon quince-ſtocks; the latter are uſed for low walls, dwarfs, or eſpaliers; and eſpecially in wet lands, theſe ſtocks doth effectually prevent the too great luxurancy of the plant, and cauſe it to produce fruit much ſooner than on a pear ſtock; but then, on the other hand, it has this evil attending it, that the tree is but ſhort-lived, and moſt of the ſorts of hard baking-pears are rendered ſtony and good for little: on the contrary, moſt melting ſoft pears are greatly improved by being grafted on quince-ſtocks, particularly if the ſoil is of a moiſt ſtrong nature.

The beſt ſeaſons to prune pear-trees is at the fall

of

of the leaf, though it may be deferred till the ſpring, obſerving to cut out all luxuriant branches, which are known by the great diſtance of their buds, and to lay in no more wood than the roots may be reaſonably ſuppoſed capable of ſupplying with ſufficient juices, leaving them at a diſtance from each other, in proportion to the ſize of the fruit; ſuch ſorts whoſe fruit are ſmall may be allowed five or ſix inches, but the larger ones muſt be not leſs than ſeven or eight inches aſunder, always remembring to train the branches horizontally as they are produced, without topping them, by which means there will be little occaſion for much pruning theſe trees; for it appears, that pear-trees have their bearing-buds in three different ſtates, continually ſucceeding each other; the blowing-buds of three years old diſcover themſelves at the fall of the leaf, which, whilſt the fruit preceding them was growing and ripening, they were preparing to ſucceed them the enſuing year: theſe buds are produced upon curſons or ſpurs, and are known by their being very full and larger than the others, in a ſeeming ſwelling impatient ſtate of breaking out into its beautiful dreſs of delightful bloom, which is enwrapped within it: the preparative buds of two years are of a ſharp conic figure, and red ruſſet colour, growing very near the fruitful buds before deſcribed: the junior buds of one year are very ſmall, but full above the bark, and always break out near the buds of two years growth; to which may be added, there is a continued ſucceſſion of buds in embryo, ad infinitum.

The diſtance pear-trees ſhould be planted, either againſt walls or eſpaliers, ſhould not be leſs than thirty feet, for if they have not room to ſpread on each ſide, it will be impoſſible to preſerve them in good order, eſpecially thoſe on free ſtocks, for the more theſe trees are pruned the more they will ſhoot: many ſorts of pears produce their bloſſom-buds at the extremity of the ſhoots, ſo that when they are ſhortened the fruit will be cut away, which cannot be avoided where the trees have not room allowed in their firſt planting.

The beſt ſeaſon for planting pear-trees in a dry ſoil is at autumn, but if the land be moiſt the ſpring is to be preferred.

Pears, in general, are windy, and improper for weak ſtomachs; however, thoſe are the beſt that are quite ripe and have a ſweet juice, and then they are ſeldom hurtful, unleſs they are eaten to exceſs.

PEARL, *Margarita*, in natural hiſtory, a hard, white, ſhining body, uſually roundiſh, found in a teſtacious fiſh reſembling an oyſter.

Pearls, though eſteemed of the number of gems by our jewellers, and highly valued, not only at this time, but in all ages, proceed only from a diſtemper in the creature that produces them, analogous to the bezoars, and other ſtony concretions in ſeveral animals of other kinds; and what the antients imagined to be a drop of dew concreted into a pearl in the body of the pear-fiſh, which they ſuppoſed roſe from the bottom to the ſurface of the water to receive it, is nothing more than the matter deſtined to form and enlarge the ſhell, burſting from the veſſels deſtined to carry it to the parts of the ſhell it would have formed, and by that means producing theſe little concretions.

The fiſh in which theſe are uſually produced is the Eaſt-Indian pearl-oyſter, as it is commonly, though not very properly, called: it has a very large and broad ſhell of the bivalve-kind, ſometimes meaſuring twelve or fourteen inches over, but thoſe of eight inches are more frequent: it is not very deep; on the outſide it is of a duſky brown, and within of a very beautiful white, with tinges of ſeveral other colours, as expoſed in different directions to the light. Beſides this ſhell, there are many others that are found to produce pearls; as the common oyſter, the muſcle, the pinna marina, and ſeveral others, the pearls of which are often very good, but thoſe of the true Indian berberi, or pearl-oyſter, are in general ſuperior to all. The ſmall or ſeed pearls, alſo called ounce pearls, from their being ſold by the ounce, and not by tale, are vaſtly the moſt numerous and common; but as in diamonds, among the multitudes of ſmall ones, there are ſmaller numbers of larger found, ſo in pearls there are larger and larger kinds; but as they increaſe in ſize, they are proportionably leſs frequent, and this is one reaſon of their great price.

Artificial PEARLS, are made by reducing ſeed-pearls to a paſte, by means of a chemical preparation called mercurial water, making the beads in ſilver moulds, boring them with a hog's briſtle, and drying them in a cloſed glaſs in the ſun.

Beads, in imitation of pearls, are alſo made of wax, and covered with the ſcales of ſeveral kinds of fiſhes.

Mother of PEARL, is the ſhell not of the pearl-oyſter, but of another ſea-fiſh of the oyſter-kind. This ſhell on the inſide is extremely ſmooth, and of the whiteneſs and water of pearl itſelf; and it has the ſame luſtre on the outſide, after the firſt laminæ or ſcales have been cleared off with aqua-fortis, and the lapidaries mill. Mother of pearl is uſed in inlaid works, and in ſeveral toys, as ſnuff-boxes, &c.

PEARL, in heraldry, in blazoning with precious ſtones, is the ſame with argent, or white.

PEARL, PIN, or WEB, in medicine, an excreſcence growing in the eye. See the article UNGUIS.

PEAT, a kind of turf uſed for fuel in ſeveral countries. See the article Moss.

In Holland they have a way of charring peat, ſo that it may ſerve for fewel in ſeveral chemical operations; but this manner of charring is not yet known in ſeveral countries where, perhaps, peat might be found.

PEBBLES, *Calculi*, ſmall ſtones, compoſed of a cryſtalline matter debaſed by earths, and hence, ſubject to veins, clouds, and other variegations. See CRYSTAL.

PECCANT, in medicine, a term uſed for thoſe humours of the body which offend either by their quantity or quality.

PECK, a meaſure of capacity, four of which make a buſhel.

PECTIS, in botany, a genus of plants, whoſe common corolla is radiated, the proper corollulæ are hermaphrodite, and funnel-ſhaped: the female florets which form the rays, are ligulated, and ovate; the ſeeds, are contained in the cup, they are ſolitary, linear, and crowned with a bearded down.

PECTORAL, an epithet for medicines good for diſorders of the breaſt and lungs. The ordinary intention of theſe medicines is either to attenuate or thicken the humours of theſe parts, and to render them fit to be expectorated or ſpit out. See the article EXPECTORANTS.

PECTORALIS, in anatomy, a pair of muſcles which poſſeſſes almoſt the whole breaſt, and ſerves to move the arm forwards.

PECULIAR, in the canon law, ſignifies a particular pariſh or church that has juriſdiction within itſelf for granting probates of wills, and adminiſtrations, exempt from the ordinary or biſhop's courts.

Court of PECULIARS, is a court in which the affairs belonging to peculiars are tranſacted.

PECUNIARY, a term applied to the puniſhment of offenders by mulct or fine.

PEDAGOGUE, or PÆDAGOGUE, παιδαγογος, a tutor or maſter to whom is committed the diſcipline and direction of a ſcholar, to be inſtructed in grammar and other arts.

PEDALIUM, in botany, a genus of plants, whoſe flower is monopetalous and ringent, the tube is trigonal, and the limb cut into five ſegments; the fruit is a reticulated nut, of a conico-tetragonal figure, containing two oblong ſeeds.

PEDALS, the largeſt pipes of an organ, ſo called becauſe played and ſtopped with the foot. The pedals are made ſquare, and of wood; they are uſually thirteen in number. They are of modern invention, and ſerve to carry the ſounds an octave deeper than the reſt. See ORGAN.

PEDANT, is uſed for a rough unpoliſhed man of letters, who makes an impertinent uſe of the ſciences, and abounds in unſeaſonable criticiſms and obſervations. Dacier defines a pedant, a perſon who has more reading than good ſenſe; and Malebranche deſcribes him, as a man full of falſe erudition, who makes a parade of his knowledge, and is ever quoting ſome Greek or Latin author, or hunting back to a remote etymology: hence,

PEDANTRY, the quality or manner of a pedant.

PEDESTAL, in architecture, the loweſt part of an order of columns, being that which ſuſtains the column, and ſerves it as a foot or ſtand. See COLUMN.

The pedeſtal conſiſts of three principal parts, viz. a ſquare, trunk, or dye, which makes the body; a corniche, the head; and a baſe, the foot of the pedeſtal. The pedeſtal is properly an appendage to a column, not an eſſential part of it; though M. Le Clerc thinks it eſſential to a complete order.

There are as many kinds of pedeſtals as there are of orders of columns, viz. the Tuſcan, Doric, Ionic, Corinthian, and Compoſite: ſome ſay that the height of the pedeſtal in each order, ought to be a third part of the whole column, comprehending the baſe and capital, and their proper adjuncts, as architrave, frieze, and corniche, a fourth part of the ſame pillar. Indeed Vignola, and moſt of the moderns, make the pedeſtal and all its ornaments in all the orders one third of the height of the column, including the baſe and capital; but ſome deviate from this rule. See the articles BASE, &c.

PEDESTALS, *of Statues*, are ſuch as ſerve to ſupport ſtatues or figures.

PEDICLE, among botaniſts, that part of a ſtalk which immediately ſuſtains the leaf of a flower or fruit, and is commonly called a foot-ſtalk.

PEDICULARIS, RED-RATTLE, or LOUSE-WORT, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is oblong and gibbous; the upper lip is helmet-ſhaped, erect, compreſſed, and emarginated; the under one is ſpreading, plane, ſemitrifid, and obtuſe; the fruit is an oblique, roundiſh, pointed capſule; with two cells, containing a number of roundiſh, compreſſed, covered ſeeds. This plant is of a cooling and drying nature, whence it is recommended in fiſtulas and other ſinous ulcers.

PEDILUVIUM, a bathing of the feet.

PEDIMENT, in architecture, is a kind of low pinnacle, ſerving to crown an ordonnance, or finiſh a frontiſpiece, and is placed as an ornament over gates, doors, windows, niches altars, &c. being ordinarily of a triangular form, but ſometimes forming an arch of a circle. The parts of a pediment are the tympanum and the corniche, which crowns it, and the entablature, which ſerves it as a baſe, or ſcale. Architects have taken a great deal of liberty in the form of this member; nor do they vary leſs as to the proportion of the pediment. The moſt beautiful, according to Daviler, is that where its height is about one fifth of the length of its baſe.

The pediment is uſually triangular, and ſometimes an equilateral triangle, called alſo a pointed pediment; it is ſometimes circular, though M. Felibien obſerves, that we have no inſtance of round

pediments

pediments in the antique, beſides thoſe in the chapels of the rotundo. Sometimes its upper corniche is divided into three or four ſides, or right lines: ſometimes the corniche is cut or open at top, which is an abuſe introduced by the moderns, particularly Michael Angelo; for the deſign of this part over doors, windows, &c. being chiefly to ſhelter thoſe underneath from the rain, to leave it open in the middle is to fruſtrate its end. Sometimes the pediment is formed of a couple of ſcrolls or wreaths, like two conſoles joined together; ſometimes again it is without a baſe, or its lower corniche is cut out, all but what is beſtowed on two columns or pilaſters, and on theſe is raiſed an arch or ſweep, inſtead of an entablature, of which Serlio gives an inſtance in the antique in a Corinthian gate at Foligny, in Umbria; and Daviler a modern one in the church of St. Peter at Rome.

Under this kind of pediments come thoſe little arched corniches, which form pediments over doors and windows, ſupported by two conſoles, inſtead either of entablature or columns.

Sometimes the pediment is made double, *i. e.* a leſs pediment is made in the tympanum of a larger, on account of ſome projecture in the middle, as the frontiſpiece of the church of the great Jeſus at Rome; but this is accounted an abuſe in architecture, though authoriſed by very good buildings, as the large pavillion of the Louvre, where the caryatides ſupport three pediments one in another: ſometimes the tympanum of the pediment is cut out, or left open to let in light, as is ſeen under the portico of the capitol at Rome; laſtly, this open pediment is ſometimes triangular, and enriched with ſculpture, as roſes, leaves, &c. as is found in moſt of the Gothic churches.

M. Le Clerc obſerves, that the modillions in the corniche of the pediment ſhould always anſwer exactly over thoſe of the entablature. Indeed Vitruvius ſays, that the ancients did not allow of any modillions at all in pediments. M. Le Clerc alſo obſerves, that the corniche which ſerves the pediment as a baſe, ſhould have no cymatium, by reaſon the cymatium of the reſt of the entablature, when it meets the pediment, paſſes over it. This change of determination occaſions a conſiderable difficulty; the cymatium in this caſe appearing too broad in the turn of the angle, to remedy which, architects have recourſe to ſeveral expedients.

A pointed pediment may crown three arches, but a circular pediment can only crown agreeably. There ſhould never be uſed more than two tympana over each other in the ſame frontiſpiece, and even where there are two, it would be proper to have the lower circular, and the upper pointed.

PEDRERO, PETERERO, or PATERERO, a ſmall piece of ordnance, uſed on board ſhips, for the diſcharging of nails, broken iron, or partridge ſhot, on an enemy attempting to board. See ORDNANCE.

They are generally open at the breech, and their chamber made to take out, to be loaded that way, inſtead of at the muzzle.

PEDUNCLE, among botaniſts, denotes a partial trunk, or foot-ſtalk, of a flower, raiſing the fructification, but not the leaves: the determination of peduncles reſpects place and manner; with regard to place they are ſaid to be radical when they come out of the root; cauline when they are placed on the ſtem; rameous when they come out upon the branches; axillary when they proceed from between the leaf and ſtem; terminal when they terminate the branches or ſtem; ſolitary when there comes but one from the ſame place. With reſpect to manner there are either uniflorous, biflorous, triflorous, or multiflorous peduncles, and are ſuch as bear one, two, three, or many flowers on each.

PEE, in mining, is uſed for the place where two veins meet and croſs one another.

PEER, in general, ſignifies an equal, or one of the ſame rank and ſtation: hence in the acts of ſome councils we find, theſe words with the conſent of our peers, biſhops, abbots, &c. Afterwards the ſame term was applied to the vaſſals or tenants of the ſame lord who were called peers, becauſe they were all equal in condition, and obliged to ſerve and attend him in his courts; and peers in fiefs, becauſe they all held fiefs of the ſame lord.

The term peers is now applied to thoſe who are impannelled in an inqueſt upon a perſon for convicting or acquitting him of any offence laid to his charge; and the reaſon why the jury is ſo called, is, becauſe by the common law, and the cuſtom of this kingdom, every perſon is to be tried by his peers or equals, a lord by the lords, and a commoner by commoners.

PEER *of the Realm*, a noble lord who has a ſeat and vote in the houſe of lords, which is alſo called the houſe of peers.

PEERESS, a woman who is noble by deſcent, creation, or marriage.

If a peereſs, by deſcent or creation, marries a perſon under the degree of nobility, ſhe ſtill continues noble: but if ſhe obtains that dignity only by marriage, ſhe loſes it, on her afterwards marrying a commoner; yet, by the curteſy of England, ſhe always retains the title of her nobility. No peereſs can be arreſted for debt or treſpaſs; for though, on account of their ſex, peereſſes cannot ſit in the houſe of lords, yet they enjoy the privileges of peers, and therefore all peereſſes by birth, are to be tried by their peers.

PEGANUM, wild rue, in botany, a genus of plants, whoſe flower conſiſts of five oblong oval petals, with fifteen ſubulated filaments, topped with

oblong erect antheræ. The fruit is a roundish, three-cornered capsule, with three cells, containing many ovate acuminated seeds.

PEGASUS, in astronomy, a constellation of the northern hemisphere, in form of a flying horse, said by different authors to contain 19, 20, and 93 stars.

PELAGIANS, a Christian sect who appeared about the latter end of the fourth, or the beginning of the fifth century.

Pelagius, the author of this sect, was born in Wales, and his name was Morgan, which in the Welch language signifies sea-born; from whence he had his Latin name Pelagius. Some of our antient historians pretend that he was abbot of Bangor; but this is impossible, because the British monasteries were of a later date. St. Austin gives him the character of a very pious man, and a Christian of no vulgar rank: according to the same father, he travelled to Rome, where he associated himself with persons of the greatest learning and figure, and wrote his commentaries on St. Paul's Epistles, and his letters to Melania and Demetrias; but being charged with heresy, he left Rome, and went into Africa, and from thence to Jerusalem, where he settled. He died somewhere in the East, but where is uncertain. He was charged with maintaining the following doctrines: 1. That Adam was by nature mortal, and whether he had sinned or not, would certainly have died. 2. That the consequences of Adam's sin were confined to his own person. 3. That new-born infants are in the same condition with Adam before the fall. 4. That the law qualified men for the kingdom of heaven, and was founded upon equal promises with the Gospel. 5. That the general resurrection of the dead does not follow in virtue of our Saviour's resurrection. 6. That the grace of God is given according to our merits. 7. That this grace is not granted for the performance of every moral act; the liberty of the will, and information in points of duty being sufficient, &c. Pelagius's sentiments were condemned by several councils in Africa, and by a synod at Antioch.

There was also a sect of Semi-Pelagians; who, with the orthodox, allowed of original sin; but denied that the liberty of the will could be so far impaired thereby, that men could not of themselves do something, which might induce God to afford his grace to one more than another: and as to election, they held, that it depended on our perseverance; God choosing only such to eternal life, as continued stedfast in the faith.

PELECINUS, a plant, otherwise called biserrula. See the article BISERRULA.

PELICAN, *Pelicanus*, in ornithology, a genus of birds, of the order of the anseres, the beak of which is very long, crooked, and unguiculated at the extremity: its sides are not denticulated, and the anterior part of the head towards the throat is naked.

PELICAN, in chemistry, a kind of double glass vessel, used in distilling liquors by circulation: it consists of a cucurbit and alembic-head, with two tubes bending into the cucurbit again.

PELLETS, in heraldry, those roundles that are black, called also ogresses and gun-stones, and by the French torteaux de sable.

PELLICLE, among physicians, &c. denotes a thin film, or fragment of a membrane.

When any liquor is evaporated in a gentle heat, till a pellicle arise at top, it is called an evaporation to a pellicle; wherein there is just liquor enough left to keep the salts in fusion.

PELLITORY, *Parietaria*, in botany. See the article PARIETARIA.

PELLUCID, the same with diaphanous, or transparent. See the article TRANSPARENT.

PELVIS, in anatomy, the lower part of the cavity of the abdomen, thus called from its resemblance to a bason, or ewer, in Latin called pelvis. It is formed by the ossa ilia and ischia, the os sacrum, the os coccygis, and the ossa pubis. See the article OSSA INNOMINATA.

The pelvis is much larger in women than in men, to give room for the growth, &c. of the fœtus.

PELVIS *of the Kidneys*, is a membranaceous cavity in the kidneys, which sends out several processes called the tubuli of the pelvis, and surrounds the renal papillæ.

PEN, or PENSTOCK. See PENSTOCK.

PENANCE, a punishment, either voluntary or imposed by authority, for the faults a person has committed.

PENÆA, in botany, a genus of plants, whose flowers are monopetalous and campanulated, with the border cut into four segments; it hath four stamina; and the fruit is a tetragonal capsule, having four cells, each containing two oblong obtuse seeds.

PENCIL, an instrument used by painters for laying on their colours. Pencils are of various kinds, and made of various materials; the larger sorts are made of boars-bristles, the thick ends of which are bound to a stick, bigger or less, according to the uses they are designed for: these, when large, are called brushes. The finer sorts of pencils are made of camels, badgers, and squirrels-hair, and of the down of swans; these are tied at the upper-end with a piece of strong thread, and inclosed in the barrel of a quill.

All good pencils, on being drawn between the lips, come to a fine point.

PENDANT, an ornament hanging at the ear, frequently consisting of diamonds, pearls, and other precious stones.

PENDANTS, in heraldry, parts hanging down from

from the label, to the number of three, four, five, or ſix at moſt, reſembling the drops in the Doric frieze. When they are more than three, they muſt be ſpecified in blazoning.

PENDANTS, of a ſhip, are thoſe ſtreamers or long colours which are ſplit and divided into two parts ending in points, and hung at the head of maſts, or at the yard-arm ends.

PENDANT-*Feathers*, with falconers, are thoſe feathers that grow behind the thighs of an hawk.

PENDANTS, among floriſts, the ſame with apices or antheræ. See ANTHERÆ and STAMINA.

PENDENTIVE, in architecture, the whole body of a vault ſuſpended out of the perpendicular of the walls, and bearing againſt the arch-boutants: or according to Daviler, it is the portion of a vault between the arches of a dome, uſually inriched with ſculpture.

The pendentives are generally of brick or ſoft ſtone; but care is to be taken, that the couches, or beds of maſonry, be always laid level, and in right lines proceeding from the ſweep whence the riſe was taken: the joints too muſt be made as ſmall as poſſible, to ſave the neceſſity of filling them up with wood, or of uſing much mortar.

PENDULOUS, a term applied to any thing that bends or hangs downwards; thus, the flowers, whoſe ſlender ſtalks are not able to ſuſtain their heads upright, are called pendulous flowers.

PENDULUM, in mechanics, denotes any heavy body, ſo ſuſpended as that it may vibrate, or ſwing, backwards and forwards, about ſome fixed point, by the force of gravity. See the article GRAVITY.

The vibrations of a pendulum are called its oſcillations. See the article OSCILLATION.

A pendulum, therefore, is any body, B, (plate LXXIII. *fig.* 1.) ſuſpended upon and moving about a fixed point, A, as a center.

The nature of a pendulum conſiſts in the following particulars: 1. The times of the vibrations of a pendulum, in very ſmall arches, are all equal. 2. The velocity of the bob, in the loweſt point, will be nearly as the length of the chord of the arch which it deſcribes in the deſcent. 3. The times of vibration in different pendulums, AB, AC, are as the ſquare roots of the times of their vibrations. 4. The time of one vibration is to the time of the deſcent, through half the length of the pendulum, as the circumference of a circle to its diameter. 5. Whence the length of a pendulum, vibrating ſeconds, will be found 39.2 inches nearly; and that of a half ſecond pendulum 9.8 inches. 6. An uniform homogeneous body, BG, (*fig.* 2.) as a rod, ſtaff, &c. which is one-third part longer than a pendulum, AD, will vibrate in the ſame time with it.

From theſe properties of the pendulum we may diſcern its uſe as an univerſal chronometer, or regulator of time, as it is uſed in clocks, and ſuch like machines.

By this inſtrument alſo we can meaſure the diſtance of a ſhip, by meaſuring the interval of time between the fire and the ſound of a gun; alſo the diſtance of a cloud, by numbering the ſeconds, or half-ſeconds, between the lightning and thunder. Thus, ſuppoſe between the lightning and thunder, we number 10 ſeconds, then (becauſe ſound paſſes through 1142 feet in one ſecond) we have the diſtance of the cloud equal to 11420 feet..

Again, the height of any room, or other object, may be meaſured by a pendulum vibrating from the top thereof. Thus, ſuppoſe a pendulum from the height of a room vibrates once in three ſeconds; then ſay, as 1 is to the ſquare of 3. viz. 9, ſo is 39.2 to 352.8 feet, the height required. Laſtly, by the pendulum we diſcover the different force of gravity on diverſe parts of the earth's ſurface, and thence the true figure of the earth. See the article EARTH.

When pendulums were firſt applied to clocks, they were made very ſhort; and, the arches of the circle being large, the time of vibration, through different arches, could not in that caſe be equal; to effect which, the pendulum was contrived to vibrate in the arch of a cycloid, by making it play between two ſemi-cycloids, CB, CD, (*fig.* 3.) whereby it deſcribes the cycloid BEAD; the property of which curve is, that a body vibrating in it, will deſcribe all its arches, great or ſmall, in equal times.

In all that has been hitherto ſaid, the power of gravity has been ſuppoſed conſtantly the ſame. But, if the ſaid power varies, the lengths of pendulums muſt vary in the ſame proportion, in order that they may vibrate in equal times; for we have ſhewn, that the ratio of the times of vibration and deſcent through half the lengths is given, and conſequently the times of vibration and deſcent through the whole length is given: but the times of vibrations are ſuppoſed equal, therefore the times of deſcent through the lengths of the pendulum are equal. But bodies deſcending through unequal ſpaces, in equal times, are impelled by powers that are as the ſpaces deſcribed, that is, the powers of gravity are as the lengths of the pendulums.

The greateſt inconvenience attending this moſt uſeful inſtrument is, that it is conſtantly liable to an alteration of its length, from the effects of heat and cold, which very ſenſibly expand and contract all metalline bodies. See the article HEAT.

To remedy this inconvenience, the common method is by applying the bob of the pendulum with a ſcrew, ſo that it may at any time be made longer or ſhorter, according as the bob is ſcrewed upwards or downwards, and thereby the times of its vibrations kept always the ſame.

Again, if a glaſs or metalline tube, uniform

throughout, filled with quick-ſilver, and 58.8 inches long, were applied to a clock, it would vibrate ſeconds for $39.2 = \frac{2}{3}$ of 58.8, and ſuch a pendulum admits of a twofold expanſion and contraction, viz. one of the metal and the other of the mercury, and theſe will be at the ſame time contrary, and therefore will correct each other. For, by what we have ſhewn, the metal will extend in length with heat, and ſo the pendulum will vibrate ſlower on that account. The mercury alſo will expand with heat, and ſince by this expanſion it muſt extend the length of the column upward, and conſequently raiſe the center of oſcillation; ſo that, by this means, its diſtance from the point of ſuſpenſion will be ſhortened, and therefore the pendulum on this account will vibrate quicker: wherefore, if the circumſtances of the tube and mercury are ſkilfully adjuſted, the time of the clock might, by this means, for a long courſe of time, continue the ſame, without any ſenſible gain or loſs.

This is the invention of the late ingenious Mr. Graham, in the year 1721, who made a clock of this ſort, and compared it with one of the beſt of the common ſort for three years together, and found the errors of the former but about $\frac{1}{3}$ part of the latter; of which the reader may ſee a farther account in the Philoſophical Tranſactions, N°. 392. It is what is now called Mr. Graham's quickſilver-pendulum.

In the forty-ſeventh volume of the Philoſophical Tranſactions, Mr. Short gives us an account of other inventions to remedy the ſame inconvenience. Mr. John Harriſon, of Barrow, in Lincolnſhire, famous for his invention of a clock to find the difference of longitude at ſea, without having the leaſt knowledge of what Mr. Graham had done before him, made ſeveral experiments upon wires of different metals, in order to find their different degrees of expanſion and contraction. He thought, that by a proper combination of wires, of two different metals, differing conſiderably in their expanſion and contraction, he might be enabled to keep the center of oſcillation of a pendulum always at the ſame diſtance from the point of ſuſpenſion.

In conſequence of theſe experiments, he made a pendulum conſiſting of one ſteel wire, at the end of which is the bob or weight; and on each ſide of this wire, four wires alternately braſs and ſteel, ſo diſpoſed and contrived as to raiſe the pendulum by the ſame quantity that it is lengthened by heat, and to let down the pendulum in the ſame proportion as it is raiſed by cold.

Mr. Harriſon, in his firſt machine for meaſuring time at ſea, likewiſe applied this combination of wires of braſs and ſteel, to prevent any alterations by heat and cold. And in the two machines or clocks he has ſince made for the ſame purpoſe, a like method of guarding againſt the irregularities ariſing from this cauſe is uſed.

Mr. Graham alſo made a pendulum conſiſting of three bars, one of ſteel between two of braſs, and the ſteel bar acted upon a lever, ſo as to raiſe the pendulum, when lengthened by heat, and to let it down when ſhortened by cold; but he found this clock liable to ſudden ſtarts and jerks in its motion.

The ingenious Mr. Ellicott, in the ſame volume of the Tranſactions, deſcribes a pendulum of his invention, compoſed of braſs and iron, with the method of applying it, ſo as to avoid the many jerks to which the machine might be liable.

But beſides the irregularities ariſing from heat and cold, pendulum-clocks are liable to others from friction and foulneſs; to obviate which, Mr. Harriſon has ſeveral excellent contrivances, whereby his clocks are almoſt entirely free from friction, and never need be cleaned. See the article FRICTION.

PENETRATION, *Penetratio*, the act whereby one thing acts upon another, or takes up the place already poſſeſſed by another.

PENGUIN, in ornithology, a name given to a ſpecies of the alca, with eight furrows on the beak, and a white ſpot before the eye. It is a very large and ſingular bird, equal to the common gooſe in ſize; the head is large, and flatted on the crown; the eyes are pretty large, and their iris grey with a tinge of yellow: the beak is of a kind of triangular figure, compreſſed at the ſides, and a little hooked juſt at the extremity: the wings and tail are ſhort, the feet ſtand backward, and the toes are connected by a membrane.

PENINSULA, in geography, a portion or extent of land, joining to the continent by a narrow neck, or iſthmus; the reſt being encompaſſed with water.

PENIS, the yard, in anatomy, the primary organ of generation in man; being called alſo mentula, virgo, priapus, and by a multitude of other names.

PENITENCE, *Penitentia*, properly ſignifies the ſame with repentance; but is alſo uſed for the diſcipline, or puniſhment, more uſually called penance.

PENITENTS, an appellation given to certain fraternities of penitents, diſtinguiſhed by the different ſhape and colour of their habit.

PENNON, or PENON, a kind of ſtandard, with a long tail, anciently belonging to a ſimple gentleman. It is oppoſed to the banner, which was ſquare.

PENNY, an ancient ſilver-coin, which, though now little uſed, was the only one current among our Saxon anceſtors. See the article COIN.

PENNY-EARTH, in agriculture, denotes a hard, loamy, or ſandy earth, with a large proportion of ſea-ſhells intermixed with it.

PENNY-ROYAL, *Pulegium*, in botany, a plant having a perennial, creeping, fibrous root, with

ſquare

ſquare ſtalks, ſome of which grow upright, and others creep on the ground, putting out roots at every joint, whereby it ſpreads and propagates very faſt; the leaves are oval, and come out from the joints of the ſtalks in pairs, oppoſite; their ſmell is agreeable, but ſtrong, and the taſte is hot: the flowers proceed from juſt above the leaves at each joint, and are diſpoſed in whorles; they are of a pale purple, ſmall, and helmet-ſhaped on the upper lip, but cut into three unequal ſegments on the lower one; they are ſucceeded by four ſmall ſeeds, placed in the bottom of the cup. It flowers in July and Auguſt, at which time it ſhould be gathered for uſe.

This plant is of a very ſubtile and penetrating nature, and is therefore aperitive, diſcutient, and carminitive; it is an excellent pectoral, and given with great ſucceſs in aſthmas, and all difficulties of breathing; ſome likewiſe recommend its application outwardly, in pains of the head; a diſtilled water of this plant, and alſo an oil, is kept in the ſhops for medicinal uſes.

This plant is held as a ſpecies of mentha, or mint, by Tournefort and Linnæus.

PENNY-WEIGHT, a troy-weight, containing twenty-four grains, each of which is equal in weight to a grain of wheat, gathered out of the middle of the ear, and well dried. See WEIGHT.

PENSION, a ſum of money paid annually for ſervices or conſiderations already paſt.

PENSIONARY, or PENSIONER, a perſon who has an appointment, or yearly ſum, payable during life, by way of acknowledgment, charged on the eſtate of a prince, company, or particular perſon.

Grand PENSIONARY, an appellation given to the firſt miniſter of the ſtates of Holland.

PENSIONARY, is alſo the firſt miniſter of the regency of each city in Holland.

PENSIONER, in general, denotes a perſon who receives a penſion, yearly ſallary, or allowance.

PENTSTOCK, a ſluice, or flood-gate, ſerving to retain or let go, at pleaſure, the water of a mill-pond, or the like. See the article SLUICE.

PENTACHORD, an antient muſical inſtrument, with five ſtrings, whence the name.

The ſtrings were of bullocks leather, and ſtruck with a plectrum made of goats-horn.

PENTACROSTIC, in poetry, a ſet of verſes ſo diſpoſed as that there are always five acroſtics of the ſame name, in five diviſions of each verſe. See the article ACROSTIC.

PENTAGON, in geometry, a figure of five ſides and five angles.

In fortification, pentagon denotes a fort with five baſtions.

PENTRAGRAPH, or PARALLELOGRAM, an inſtrument whereby deſigns of any kind may be copied in what proportion you pleaſe, without being ſkilled in drawing.

PENTAMETER, in antient poetry, a kind of verſe conſiſting of five feet, or metres; whence the name.

The two firſt feet may be either dactyls or ſpondees, at pleaſure; the third is always a ſpondee, and the two laſt anapeſts.

PENTANDRIA, the name of the fifth claſs in the Linnæan ſyſtem of botany; it comprehends all thoſe plants whoſe flowers are hermaphrodite; each containing five ſtamina, or male parts of generation. To this claſs belong the vine, gooſberry, curran, primroſe, borage, nightſhade, flax, with many other genera.

PENTAPETALOUS, an appellation given to flowers that conſiſt of five petals or leaves.

PENTAPETES, in botany, a genus of plants, whoſe flower hath five oblong patent petals, and fifteen linear ſtamina, joined in a tube at their baſe, five of which are larger, coloured, and caſtrated; the antheræ of the others are oblong and erect: the fruit is an ovate ligneous capſule, with five cells, containing a number of oblong compreſſed ſeeds.

There is but one known ſpecies belonging to this genus, which is a native of India; the flowers are of a fine ſcarlet, and with us they blow from July to September, in ſucceſſion: the whole plant is annual, and raiſed from ſeeds on a hot-bed in the ſpring.

PENTASTICH, πενταστιχον, in poetry, a ſtanza, or diviſion of a poem, conſiſting of five verſes; whence the name

PENTASTYLE, in architecture, a building wherein there are five rows of columns. See the article COLUMN.

PENTATEUCH, πενταteυχος, an appellation given to the firſt five books of the Old Teſtament, viz. Geneſis, Exodus, Leviticus, Numbers, Deuteronomy.

PENTECOST, a ſolemn feſtival of the Jews, ſo called becauſe it was celebrated on the fiftieth day after the ſixteenth of the month Niſan, which was the ſecond day of the paſſover.

The feaſt of pentecoſt was inſtituted in memory of the law's being given, on the fiftieth day after the Iſraelites came out of Egypt.

It was on the feaſt of pentecoſt that the Holy Ghoſt miraculouſly deſcended on the apoſtles. See WHITSUNDAY.

PENTHEMIMERIS, in antient poetry, a part of a verſe conſiſting of two feet and a long ſyllable.

PENTHORUM, in botany, a genus of plants whoſe flower hath ſometimes no petals, but often five, which are linear, ſmall, and placed in the edge of the cup; the ſtamina are ten ſetaceous perſiſtent filaments, topped with roundiſh deciduous antheræ; the fruit is a quinquefid capſule, containing a great many very ſmall ſeeds.

PENULTIMA, or PENULTIMATE SYLLABLE, in grammar, denotes the laſt ſyllable but one

one of a word; and hence the anti-penultimate syllable is the last but two, or that immediately before the penultima.

PENUMBRA, in astronomy, a partial shade observed between the perfect shadow and the full light in an eclipse.

It arises from the magnitude of the sun's body; for were he only a luminous point, the shadow would be all perfect: but by reason of the diameter of the sun, it happens that a place which is not illuminated by the whole body of the sun, does yet receive rays from a part thereof. See the article ECLIPSE.

PEONY, in botany, see PÆONIA.

PEPASMUS, in medicine, denotes the digesting and concocting of morbid humours.

PEPASTIC, or PEPTIC, in physic, are medicaments of the consistence of an emplaister, for bringing humours to a head, and disposing them to maturation.

PELPIS, water purslain, in botany, a genus of plants, whose flower hath six ovate very small petals, with six short stamina: the fruit is a hard shaped capsule with two cells, containing a number of small three-cornered seeds.

PEPO, the POMPION, in botany, is comprehended by Linnæus among the cucurbita. See the article CUCURBITA.

PEPPER, Piper, in botany, a shrub, whose root is small, fibrous, tough, and blackish, from which arises many shoots that are tough, flexible, green, and woody, laying on the ground, unless propped up; they have several knots or joints, at each of which the leaves are alternately disposed; these are of a roundish form, two or three inches broad, and four long, terminating in points; the texture is thick and firm, and on the upper part they are of a shining dusky green, but beneath of a light green, and have short thick pedicles: the flowers grow in spikes, closely covered, with very small apetalous flowers without filaments; the antheræ are two in number, of a roundish form, and opposite to the root of the germen, which is large and oval, and crowned with a triple prickly stigma: the fruit is a roundish unilocular berry, containing one globose seed, which is green at first, and red when ripe, but in drying they grow black and wrinkled. It comes from Malabar, Java, Sumatra, and other parts of the East-Indies. This kind of pepper is of common and general use, and is every where employed as a spice to create an appetite, and help digestion.

Another sort of pepper, called Long Pepper, is an upright dried fruit, about an inch or an inch and a half long; it is oblong, round, cylindraceous, and, as it were, streaked with spiral lines, with tubercles placed in the form of a net; within it is divided into several small cells, containing each a small round seed, blackish without, but whitish within, with an acrid, hot, bitterish taste: long pepper is commonly pickled, and is in high esteem among some. It is very good for cold, phlegmatic constitutions.

When the rind of black pepper is taken off it appears white, and is the only sort brought to us by the name of white pepper, though some botanical authors give us an account of a species, whose fruit is naturally white, however, there is said to be no difference between the plants that produce them, except in the colour of the fruit: it is now very rare, and only to be found in certain places of Malabar and Malacca. They have all much the same virtues, for they heat, dry, attenuate, resolve, open and strengthen relaxed fibres of the viscera, and by exciting an oscillation therein, refresh the spirits, divide gross humours, and encrease the circulation of the blood. In the East-Indies they have a way of preserving the common and long pepper in vinegar, and eating them afterwards at meals.

Jamaica PEPPER, *Pimenta*, in botany. See the article PIMENTA.

Water-PEPPER, in botany. See the article POLYGONUM.

PEPPER-MINT, in botany. See the article MINT.

PERAMBULATOR, in surveying, an instrument for measuring distances, called also pedometer, way-wiser, and surveying-wheel.

It consists of a wheel, A A, (plate LXXIII. *fig.* 4.) two feet seven inches and a half in diameter; consequently, half a pole, or eight feet three inches in circumference. On one end of the axis is a nut, three quarters of an inch in diameter, and divided into eight teeth; which, upon moving the wheel round, fall into the teeth of another nut *c* (*fig.* 5.) fixed on one end of an iron rod Q, and thus turns the rod once round, in the time the wheel makes one revolution. This rod, lying along a groove in the side of the carriage of the instrument, under the dotted line, has at its other end a square hole, into which is fitted the end *b* of a small cylinder P. This cylinder is disposed (*fig.* 6.) under the dial-plate of a movement, at the end of the carriage B, in such a manner as to be moveable about its axis; its end *a* is cut into a perpetual screw, which falling into the thirty two teeth of a wheel perpendicular thereto, upon driving the instrument forward, that wheel makes a revolution each sixteenth pole. On the axis of this wheel is a pinion with six teeth, which, falling into the teeth of another wheel of sixty teeth, carries it round every hundred and sixtieth pole, or half a mile.

This last wheel, carrying a hand or index round with it over the divisions of a dial-plate, whose outer limb is divided into one hundred and sixty parts, corresponding to the one hundred and sixty poles, points out the number of poles passed over. Again, on the axis of this last wheel is a pinion, containing twenty teeth, which, falling into the

teeth

teeth of a third wheel, which hath forty teeth, drives it once round in three hundred and twenty poles, or a mile. On the axis of this wheel is a pinion of twelve teeth, which, falling into the teeth of a fourth wheel, having seventy-two teeth, drives it once round in twelve miles.

This fourth wheel, carrying another index over the inner limb of the dial-plate, divided into twelve for miles, and each mile subdivided into halves, quarters, and furlongs, serves to register the revolutions of the other hand, and to keep account of the half miles and miles passed over as far as twelve miles.

The use of this instrument is obvious from its construction. Its proper office is in the surveying of roads and large distances, where a great deal of expedition, and not much accuracy, is required. It is evident, that driving it along, and observing the hands, has the same effect as dragging the chain, and taking account of the chains and links. Its advantages are its handiness and expedition; its contrivance is such, that it may be fitted to the wheel of a coach, in which state it performs its office, and measures the road without any trouble at all.

PER ARSIN ET THESIN, in music. Per arsin, in a song, counterpoint, figure, &c. is when the notes ascend from grave to acute; and per thesin, when they descend from acute to grave.

PERCA, the pearch, in ichthyology, a genus of the acanthopterygious order of fishes, the characters of which are, that the branchiostege membrane on each side contains seven bones, and the back has one or two fins.

Besides the common pearch, this genus comprehends the lucius and lucioperca. See the articles LUCIUS and LUCIOPERCA.

The pearch is distinguished by several tranverse streaks, and by having the belly-fins red: it grows in some places to a foot and a half in length, and is considerably thick in proportion; but its more usual size is eight or nine inches in length: its nostrils are large and patulous, and nearer the eyes than the extremity of the snout.

PERCEPTION, in logic, the first and most simple act of the mind, whereby it perceives or is conscious of its ideas. See the article IDEA.

In bare perception, the mind is for the most part only passive; yet impressions made on the senses cause no perception, unless they are taken notice of by the mind, as we see in those who are intently busied in the contemplation of certain objects. It ought also to be observed, that the ideas we receive by perception are often altered by the judgment, without our taking notice of it; so that we take that for the perception of our senses, which is but an idea formed by the judgment: thus, a man who reads, or hears, without attention, takes little notice of the characters or sounds, but of the ideas excited in him by them. See the article JUDGMENT.

The faculty of perception seems to be that which constitutes the distinction between the animal kingdom and the inferior parts of nature. Perception is also the first step towards knowledge, and the inlet of all the materials of it; so that the fewer senses a man has, and the duller the impressions that are made by them are, the more remote he is from that knowledge which is to be found in other men. See KNOWLEDGE.

PERCH, or PEARCH, *Perca*. See the article PERCA.

PERCH, a measure of length. See the article MEASURE.

PERCUSSION, in mechanics, the impression a body makes in falling or striking upon another, or the shock of two bodies in motion. See the article MOTION.

Percussion is either direct or oblique; direct, when the impulse is given in a line perpendicular to the line of contact; and oblique, when it is given in a line oblique to the point of contact. See the article CENTER.

PERENNIAL, in botany, is applied to those plants whose roots will abide many years, whether they retain their leaves in winter or not: those which retain their leaves are called ever-greens; but such as cast their leaves, are called deciduous, or perdifols. Some of these have annual stalks, which die to the root every autumn, and shoot up again in the spring; to which Jungius gives the title of radix restibilis.

PERESKIA, in botany, a trailing plant, with many slender branches beset with long white spines, produced in tufts; the leaves are roundish, very thick, and succulent; the flower is rosaceous, consisting of several petals, which are placed orbicularly: the fruit is soft, fleshy, and globular, about the size of a walnut, having tufts of small leaves on it, and contains many flat roundish seeds, included in a whitish mucilaginous pulp. This plant grows naturally in some parts of the Spanish West-Indies, and is included by Linnæus among the cactus, which see.

PERFECTION, the state or quality of a thing perfect.

PERFUME, *Suffitus*, an agreeable artificial odour, affecting the organ of smelling. The generality of perfumes are made up of musk, ambergrise, civet, rose and cedar-woods, orange-flowers, jasmin, jonquils, tuberoses, and other odoriferous flowers: those drugs commonly called aromatics, such as storax, frankincense, benzoin, cloves, mace, &c. enter the composition of a perfume: some are also composed of aromatic herbs or leaves, as lavender, marjoram, sage, thyme, hyssop, &c.

Perfumes were antiently very much in use: but

ſince people are become ſenſible of the harm they do the head, they are generally diſuſed among us; however they are ſtill common in Spain and Italy.

PERFUMES, in pharmacy, are topical or external remedies, compoſed of certain powders and gums, wich being mixed together, and thrown on the coals, produce a vapour and ſmoke of great uſe in ſeveral diſeaſes. There are dry perfumes made up in troches, pills, &c. of olibanum, maſtic, olives, &c. and moiſt viſcous ones mixed with the juices of herbs.

PERIAGOGE, or PERIBOLE, in rhetoric, is uſed where many things are accumulated into one period which might have been divided into ſeveral.

PERIANTHIUM, in botany expreſſes that ſort of cup of a flower which either conſiſts of ſeveral leaves, or elſe of one leaf divided into ſeveral ſegments, and ſurrounds the lower part of the flower.

PERICARDIUM, in anatomy, a membranaceous bag, looſely including the heart, and ſituated in the middle and lower part of the thorax, between the two lobes of the lungs. See HEART.

PERICARPIUM, among botaniſts, a caſe or covering for the ſeeds of plants, and is the germen of the piſtillum enlarged; it is defined by Linnæus as an entrail of the plant big with ſeeds, which it diſcharges when ripe; and is diſtinguiſhed according to the circumſtances that attend it by the following appellations: 1. A capſule. 2. A pod. 3. A legumen. 4. A conceptacle. 5. A drupe. 6. An apple. 7. A berry. 8. A nut. 9. A ſtrobilus. See the articles CAPSULE, POD, &c.

PERICRANIUM, in anatomy, a thick ſolid coat, or membrane covering the outſide of the cranium or ſkull.

PERIDROME, *Peridromus*, in ancient architecture, the ſpace, gallery, alley, or the like, in a periptere, between the columns and the wall.

PERIGÆUM, PERIGEE, in aſtronomy, that point of the ſun's or moon's orbit, wherein they are at their leaſt diſtance from the earth, in which ſenſe it ſtands oppoſed to apogee. See APOGEE.

In the antient aſtronomy, perigee denotes that point in a planet's orbit, wherein the centure of its epicycle is at the leaſt diſtance from the earth.

PERIHELIUM, in aſtronomy, that point of a planet's, or comet's orbit, wherein it is in its leaſt diſtance from the ſun; in which ſenſe it ſtands in oppoſition to aphelium.

The antient aſtronomers, on account of their ſuppoſing the earth in the center of the ſyſtem, inſtead of this term uſed that of perigæum.

PERIMETER, in geometry, the bounds or limits of any figure or body.

The perimeter of ſurfaces or figures are lines, thoſe of bodies are ſurfaces. In circular figures, inſtead of perimeter, we ſay circumference, or periphery.

PERINÆUM, or PERINEUM, in anatomy, the ſpace between the anus and the parts of generation, divided into two equal lateral diviſions, by a very diſtinct line, which is longer in males than in females.

PERIOD, in aſtronomy, the time taken up by a ſtar or planet in making a revolution round the ſun; or the duration of its courſe till it return to the ſame point of its orbit.

PERIODS, in chronology, denotes a revolution of a certain number of years, or a ſeries of years, whereby, in different nations, and on different occaſions, time is meaſured; ſuch are the following.

Calippic PERIOD, a ſyſtem of ſeventy-ſix years.

The calippic period comprehends 48 common years, and 28 intercalary ones, 940 lunations, and 22759 days.

Dionyſian PERIOD, or *Victorian* PERIOD, a ſyſtem of 532 lunæ-ſolar and Julian years, which being elapſed, the characters of the moon fall again upon the ſame day and feria, and revolve in the ſame order, according to the opinion of the antients.

This period is otherwiſe called the great paſchal cycle, becauſe the Chriſtian church firſt uſed it, to find the true time of the paſcha, or Eaſter. The ſum of theſe years ariſe by multiplying together the cycles of the ſun and moon. See the article EASTER.

Hipparchus's PERIOD, a ſyſtem of 304 years, both lunar and ſolar, which being elapſed, Hipparchus thought that the reckoning by the lunar motion would coincide again with the ſolar meaſures. This period comprehends 3760 lunar months, or 111039 days; the ſum of which ariſes from the multiplication of the calippic period by 4, ſubtracting unity from the product.

Julian PERIOD. See JULIAN.

Metonic PERIOD, that invented by Meton, being the ſame with the cycle of the moon. See the article CYCLE.

PERIOD, in grammar, denotes a ſmall compaſs of diſcourſe, containing a perfect ſentence, and diſtinguiſhed at the end by a point, or full ſtop, thus (.); and its members or diviſions marked by commas, colons, &c. See the articles POINT and SENTENCE.

PERIOD is alſo uſed for the character (.) wherewith the periods of a diſcourſe are terminated, or expreſſed, being commonly called a full ſtop or point. See the article PUNCTUATION.

PERIOD, in numbers, a diſtinction made by a point, or comma, after every ſixth place or figure; and is uſed in numeration for the readier diſtinguiſhing and naming the ſeveral figures or places.

PERIOD *of a Diſeaſe*, in medicine, is the time betwixt the acceſs of one fit, or paroxiſm, and that of the next, including the entire exacerbation, decline,

cline, and intermiſſion, or remiſſion. Theſe, in ſome diſorders, are very regular and conſtant, as in intermitting fevers; but in chronical diſorders, more irregular and uncertain, as in epilepſies; hence ſuch diſeaſes are called periodical.

PERIODIC, or PERIODICAL, ſomething that terminates or comprehends a period: ſuch is a periodic month, being the ſpace of time wherein the moon diſpatches her period; a periodic diſeaſe, &c. See MONTH, DISEASE, PERIOD, &c.

PERIOECI, περιοικοι, in geography, ſuch inhabitants of the earth, as have the ſame latitudes, but oppoſite longitudes; or live under the ſame parallel, and the ſame meridian, but in different ſemicircles of that meridian, or in oppoſite points of the parallel. Theſe have the ſame common ſeaſons throughout the year, and the ſame phænomena of the heavenly bodies; but when it is noon day with the one, it is midnight with the other; there being twelve hours between them in an eaſt or weſt direction. Theſe are found on the globe, by the hour index, or by turning the globe half round, that is 180 degrees either way.

PERIOSTEUM, or PERIOSTIUM, in anatomy, a nervous vaſculous membrane, endued with a a very quick ſenſe, immediately ſurrounding, in every part, both the internal and external ſurfaces of all the bones in the body, excepting only ſo much of the teeth as ſtand above the gums, and the peculiar places on the bones, in which the muſcles are inſerted. It is hence divided into the external and internal perioſteum; and where it externally ſurrounds the bones of the ſkull, it is called the pericranium.

PERIPATETIC PHILOSPHY, that ſyſtem taught and eſtabliſhed by Ariſtotle, and maintained by his followers, the peripatetics, called alſo Ariſtotelians.

The greateſt and beſt part of Ariſtotle's philoſophy, he is ſaid to have borrowed from his maſter Plato. Serranus affirms confidently, and ſays that he is able to demonſtrate it, that there is nothing exquiſite in any part of Ariſtotle's philoſophy, dialectics, ethics, politics, phyſics, or metaphyſics, but is found in Plato: and of this opinion are many of the ancient authors, Clemens Alexandrinus, &c. Ariſtotle's philoſophy preſerved itſelf *in puris naturalibus*, a long time, none of his followers or commentators having dared to make any innovation therein, till the beginning of the thirteenth century, when it began to be new modelled. A reformed ſyſtem of peripateticiſm was firſt introduced into the ſchools in the univerſity of Paris, from whence it ſoon ſpread throughout Europe, and has ſubſiſted in the univerſities to this day, under the name of ſchool philoſophy; the foundation whereof is Ariſtotle's doctrine frequently miſunderſtood, and oftener miſapplied: but of theſe, at different times, have ſprung ſeveral branches, as the Thomiſts, Scotiſts, nominaliſts, &c. See the articles THOMISTS, &c.

PERIPETIA, περιπετεια, in the drama, that part of a tragedy, wherein the action is turned, the plot unravelled, and the whole concludes. See the article CATASTROPHE.

The qualities of the peripetia are, that it be probable and neceſſary; in order to which it muſt be the natural reſult, at leaſt the effect of the foregoing action, or of the ſubject itſelf, and muſt not ſtart from any foreign or collateral cauſe. The peripetia is ſometimes induced by remembrance or diſcovery, and ſometimes without any diſcovery.

PERIPHERY, in geometry, the circumference of a circle, ellipſes, or any other regular curvilinear figure. See the article CIRCUMFERENCE, CIRCLE, &c.

PERIPHRASIS, in rhetoric, the ſame with circumlocution. See the article CIRCUMLOCUTION.

PERIPLOCA, climbing dog's-bane, in botany, a genus of plants, whoſe flower is plane, monopetalous, rotated, and cut into five narrow ſegments, which are emarginated; it hath a ſmall nectarium going round the center of the petal, and five incurved filaments which are ſhorter than the corolla: the ſtamina are ſhort, and topped with erect antheræ, which join in a head: the fruit conſiſts of two large, oblong, ventricoſe follicles, each formed of a ſingle valve, having one cell, which contains a number of imbricated ſeeds crowned with down: the receptacle is longitudinal and hairy.

PERIPNEUMONY, in medicine, an inflammation of the lungs, attended with a weight in the lungs, a difficulty of breathing, and an oppreſſion of the breaſt, with a purulent ſpitting, and a fever accompanied with a cough. When the inflammation affects both the lobes, and the whole body of the lungs, the caſe is deſperate.

The peripneumony is diſtinguiſhed into two kinds; one of which has its ſeat at the extremity of the pulmonary artery, and is called the true peripneumony; and the other is ſituated in the bronchial arteries, and is called the ſpurious or baſtard peripneumony.

The true peripneumony is often cured by a critical reſolution and concoction of the morbific matter, which is either attenuated, ſo as to be returned into the channels in the common courſe of circulation; or expectorated by coughing; which may be eaſily known by an abatement of the ſymptoms, and the patient's falling into gentle breathing ſweats.

Copious bleeding is the moſt effectual remedy in the beginning of this diſeaſe; but not ſo proper when expectoration goes on ſucceſsfully, becauſe it ſometimes ſuppreſſes it, and in that caſe ſudorifics thicken the matter which is expectorated. The motions of nature ought to be followed: the aliment ought to be more ſlender and thin than in any other inflammatory diſeaſe whatſoever; common whey

whey is ſufficient to preſerve the ſtrength of the patient; relaxing aliments are proper, of which barley, and all its preparations, are the beſt. Dieuretics that have not much acrimony are uſeful; and for this intention, an infuſion of fennel-roots in warm water, with milk, is good. If nature relieves by a diarrhœa, without ſinking the ſtrength of the patient, it ought to be promoted by emollient clyſters. But if the patient is neither relieved nor dies in eight days, the inflammation will end in a ſuppuration, and an abſceſs of the lungs, and ſometimes in ſome other part of the body: in this caſe bleeding muſt be forborne; the diet muſt be mild, ſoft, incraſſating, and more plentiful; and tepid vapours ſhould be taken into the lungs, from decoctions of proper ingredients. When, by the ſymptoms and time, the impoſthume may be judged to be ripe, the vapour of vinegar, and any thing that creates a cough, are proper; for the ſooner it is broke, the leſs danger will the lungs be in. In this ſtate, which is not abſolutely deſperate, the aliment ought to be milk, and the drink milk and barley-water, with gentle anodynes, and the patient may have ſome reſt.

Spurious or *Baſtard* PERIPNEUMONY, a diſeaſe of the lungs, which generally ariſes from a heavy pituitous matter generated in the blood, and caſt upon the lungs.

In this diſorder, the patient is hot and cold by turns, is giddy upon the leaſt motion, and complains of a rending pain of the head whenever he coughs; he vomits up every thing that he drinks; the urine is turbid and red, and the whole thorax full of pain. To remedy which, he ſhould be let blood from a large orifice; and then give him the following clyſter, which muſt be repeated daily, till the ſymptoms evince that the lungs are relieved: take of honey, three ounces; of nitre, one dram; one yolk of an egg; and eight ounces of barley-ley-water; make them into a clyſter. Let the patient's diet be very ſlender, ſuch as weak broths, ſharpened a little with orange or lemon-juice; and he may drink a weak mixture of honey and water: the ſteams of warm water may be taken in at the mouth, and the following decoction may be given him: take of the roots of fennel, two ounces; of the roots of graſs, four ounces; of the leaves of pellitory, and agrimony, each a handful and a half; of the bruiſed ſeeds of white poppy, one ounce; and of liquorice, one ounce and a half; boil them, for a quarter of an hour, in two pints and a half of water: of which, let the patient drink two ounces every two hours. Likewiſe, let his legs and feet be bathed, and large bliſters applied.

PERIPTERE, in the ancient architecture, a building encompaſſed on the outſide with a ſeries of inſulated columns, forming a kind of portico all around; ſuch were the portico of Pompey, the ſeptizon of Severus, and the baſilica of Antoninus.

The peripteres were properly temples, which had columns on all the four ſides, by which they were diſtinguiſhed from the proſtyle and amphiproſtyle, the laſt of which had no columns before, and the firſt none on the ſides.

M. Perault obſerves, that periptere, in the general ſenſe of the word, is the name of a genus, including all the ſpecies of temples, which have porticos of columns all around, whether the columns be diptere, or pſeudo-diptere, or ſimply periptere, which is a ſpecies that bears the name of a genus, and which has its columns diſtant from the wall, the breadth of an intercolumnation.

PERISCII, in geography, the inhabitants of either frigid zone, between the polar circles and the poles; where the ſun, when in the ſummer ſigns, moves only round about them, without ſetting, and conſequently their ſhadows, in the ſame day, turn to all the points of the horizon.

PERISKYTISM, in ancient ſurgery, an inciſion made under the coronal ſuture, reaching from one temple acroſs to the other, penetrating to the bone of the cranium.

PERISTALTIC, in medicine, a vermicular ſpontaneous motion of the inteſtines, performed by the contraction of the circular and longitudinal fibres, of which the fleſhy coats of the inteſtines are compoſed; by means whereof the chyle is driven into the orifices of the lacteal veins, and the fæces are protruded towards the anus. See CHYLIFICATION.

When this motion comes to be depraved, and its direction changed, ſo as to proceed from below upwards, it produces what is called the illiac paſſion. See the article ILLIAC PASSION.

PERISTAPHYLINUS, in anatomy, a name which ſome give to a muſcle of the uvula, more properly denominated pterygoſtaphylinus. See the article UVULA and PTERYGOSTAPHYLINUS.

PERISTYLE, in ancient architecture, a building encompaſſed with a row of columns on the inſide: ſuch was the hypæthre temple of Vitruvius, and ſuch are now ſome baſilicas in Rome, ſeveral palaces in Italy, and moſt cloiſters of religious.

Periſtyle is alſo uſed, by modern writers, for a range of columns, either within or without a building: thus we ſay, the Corinthian periſtyle of the portal of the Louvre, &c.

PERISYSTOLE, in medicine, the interval of reſt between the two motions of the heart, viz. that of the ſyſtole, or contraction, and that of the diaſtole, or dilatation.

PERITONÆUM, in anatomy, is a thin, ſmooth, and lubricous membrane, inveſting the whole internal ſurface of the abdomen, and containing moſt of the viſcera of that part, as it were in a bag.

PERITROCHIUM, in mechanics, denotes a wheel, or circle, concentric with the baſe of a cylinder,

linder, and moveable together with it, about an axis. See Axis *in Peritrochio.*

PERJURY, in law, the crime of ſwearing falſely, where a lawful oath is adminiſtered by one in authority, in a matter relating to the iſſue or cauſe in queſtion, whether it be a perſon's own wilful act, or done by the ſubordination of others.

PERIWINKLE, in the hiſtory of ſhell-fiſh, a ſpecies of buccinum. See Buccinum.

Periwinkle, *Vinca*, in botany. See the article Vinca.

PERMANENT, in general, ſomething that continues the ſame, whether in nature or ſituation, and other circumſtances: thus, air generated by fermentation, is ſaid to be permanent, becauſe it continues to ſhew all the natural properties of the common air.

Thus, alſo, thoſe cups of flowers are called permanent, which remain after the flower-leaves are fallen.

PERMEABLE, a term applied to bodies of ſo looſe and porous a ſtructure, as to let ſomething paſs through them.

PERMUTATION, in commerce, the ſame with bartering. See Bartering.

In the canon-law, permutation denotes the actual exchange of one benefice for another.

Permutation *of Quantities*, in algebra, the ſame with combination.

PERNIONES, Chilblains, or Kibes, in ſurgery, a name given to thoſe tumours which happen in the hands and feet, from violent cold. See the article Cold.

Chilblains are accompanied with inflammation, heat, redneſs, pricking pain, and immobility of that limb: ſometimes they are of a livid or leaden colour, and ſometimes they break out with ſcabs, or elſe with chops or ſlits, which afterwards penetrate deeper, and become ulcerous. The humour which they diſcharge is a little fœtid, and pretty much reſembles pus or ſanies; and they terminate in either diſperſion, ſuppuration, or gangrene, and ſphacelus.

While the chilblains are yet tumified and red, and the part retains its ſenſe and motion, without any great heat and pain, the diſorder is then of the mildeſt kind; on the contrary, when they are livid, occaſion the ſkin to become ſtiff and inſenſible, or excite pricking pains therein, there is then danger of a worſe conſequence, leſt it ſhould degenerate into a gangrene, or at leaſt a deep exulceration.

There being no room to doubt but that cold is the cauſe of chilblains, it readily follows, that the cure muſt conſiſt chiefly in reſtoring the blood to its former fluidity, and free circulation, as ſoon as poſſible; for which purpoſe, an external as well as internal treatment is neceſſary.

In the external treatment, the patient being expoſed in a temperate air, ſhould, according to Heiſter, exerciſe his limbs as much as poſſible, in order to advance him ſtill to a greater warmth or heat; but when he is too weak to exerciſe himſelf, it will be proper to bathe the parts affected with ſnow, or cold water; after which, when the limb becomes ſenſible, comfortable medicines may be applied, ſuch as ſpirit of wine, either pure or with theriaca, rock-oil, balſam of ſulphur, &c. When the parts affected have been well rubbed or bathed with theſe, the patient may then be advanced towards the fire, or be put to bed, endeavouring afterwards to excite a gentle ſweat.

In the internal treatment, great ſervice will be had from a few glaſſes of hot wine, wherein has been boiled ſome cinnamon and ſugar; though it may not be improper to give with this, alternately, a ſmall quantity of ſome ſudorific mixture.

If the wine be not at hand, good ale, boiled with cinnamon, cloves, and ſugar, may well enough ſupply its place. It ſhould be continued ſo as to keep up a ſweat for a whole hour, for half an hour, or according to the ſeveral circumſtances: but if the diſorder is much ſlighter, this method is then not ſo directly neceſſary; it may then be laid aſide: though, in the opinion of Heiſter, it is much preferable to any other method. When chilblains tend to a ſuppuration, then it is proper to treat them like other abſceſſes. See the article Abscess.

If a patient has before been troubled with children, which are uſed to return every year in the winter, the preſervative againſt the diſorder is to anoint the parts affected with petroleum, or oil of turpentine, before and after the ſeverity of the winter comes on; but when the diſorder has begun to ſhew itſelf again by tumour, inflammation, and pain, the heel or finger may be wrapped up in a ſwine's bladder, dipped in the 'fore-mentioned oil, and the cold itſelf ſhould always be carefully avoided by proper cloths, or coverings.

PERORATION, *Peroratio*, in rhetoric, the epilogue, or laſt part of an oration, wherein what the orator had inſiſted on through his whole diſcourſe, is urged afreſh with greater vehemence and paſſion.

The peroration conſiſts of two parts. 1. Recapitulation, wherein the ſubſtance of what was diffuſed throughout the whole ſpeech, is collected briefly, and curſorily, and ſummed up with new force and weight. 2. The moving the paſſions, which is ſo peculiar to the peroration, that the maſters of the art call this part ſedes affectuum. The paſſions to be raiſed are various, according to the various kinds of oration. In a panegyric, love, admiration, emulation, joy, &c. In an invective, hatred, contempt, &c. In a deliberation, hope, confidence, or fear. The qualities required in the peroration are, that it be very vehement and paſſionate, and that it be ſhort; becauſe, as Cicero obſerves, tears ſoon dry up.

PERPENDICULAR, in geometry, a line falling directly on another line, ſo as to make equal angles on each ſide; called alſo a normal line. See ANGLE.

PERPENDICULAR *to a Parabola*, is a right-line cutting the parabola in the point in which any other right-line touches it, and is alſo itſelf perpendicular to that tangent.

PERPENDICULARITY OF PLANTS, in natural hiſtory, a quality obſerved in all plants, which, though they riſe a little crooked, yet the ſtems ſhoot up, and the roots ſink down, as much as poſſible in a perpendicular direction.

This curious phænomenon was firſt obſerved by M. Dodart, who publiſhed an expreſs eſſay on the affectation of perpendicularity obſerved in the ſtems or ſtalks of all plants, in the roots of many, and even in their branches. He obſerves, that ſuch plants, or parts of plants, as by the declivity of the ſoil come out inclined, or ſuch as are diverted out of the perpendicular by any violent means, again redreſs and ſtraighten themſelves, and recover their perpendicularity by making a ſecond or contrary bend, or elbow, without rectifying the firſt.

PERPETUITY, in law, is when an eſtate is intended to be ſo ſettled in tail, &c. that it may not poſſibly be undone, or made void.

PERQUISITE, in law, is any thing gotten by a man's own induſtry, or purchaſed with his money; in contradiſtinction to what deſcends to him, from his father or other anceſtors.

PERQUISITES *of Courts*, are the profits which caſually accrue to a lord of the manor from his courts-baron, by fines for copyholds, eſcheats, heriots, amercements, &c.

PERRON, in architecture, the ſteps in the front of a building, raiſed before the doors of great houſes, and leading to the firſt ſtory, when raiſed above the level of the ground.

PERRY, a drink made of pears, in the ſame manner as cyder is made from apples. See the article CYDER.

PERSEA, Avocado-pear, in botany, an evergreen-tree, which grows to the height of thirty feet, and upwards; the trunk is large, ſmooth, and of an aſh-colour; the branches are furniſhed with large, oblong, ſmooth leaves, like thoſe of laurel, and of a deep green-colour; the flowers are produced towards the extremities of the branches, and are hexapetalous, acuminated, and ſpread open: the fruit is fleſhy and pyramidical (about the ſize of one of our largeſt pears) incloſing a large oval ſeed, with two lobes, included in a thin ſhell.

This tree grows in great plenty in the Weſt-Indies, and is eſteemed by its inhabitants not only as a deſert, but as very neceſſary for the ſupport of life: the fruit alone is very inſipid, for which reaſon they generally eat it with the juice of lemons and ſugar, to give it a pungency; it is very nouriſhing and is reckoned a great incentive to venery: it is eaten by ſome people with vinegar and pepper.

This plant is comprehended by Linnæus among the laurus; it is raiſed from ſeed, and requires a hot-houſe in this climate to preſerve it.

PERSECUTION, is any pain or affliction which a perſon deſignedly inflicts upon another; and, in a more reſtrained ſenſe, the ſufferings of chriſtians on account of their religion.

PERSEVERANCE, in theology, a chriſtian virtue, by which we are enabled to perſiſt in the way of ſalvation to the end.

PERSEUS, in aſtronomy, a conſtellation of the northern hemiſphere, which, according to the catalogues of Ptolemy and Tycho, contains twenty-nine ſtars; but in the Britannic catalogue, ſixty-ſeven.

PERSIAN-WHEEL, an engine, or wheel, turned by a rivulet, or other ſtream of water, and fitted with open boxes at its cogs, to raiſe water for the overflowing of lands, or other purpoſes.

It may be made of any ſize, according to the height the water is to be raiſed to, and the ſtrength of the ſtream by which it is turned. This wheel is placed ſo, that its bottom only is immerſed in the water, wherein the open boxes at its cogs are all filled, one after another, with water, which is raiſed with them to the upper part of the wheel's circuit, and then naturally empties itſelf into a trough which carries it to the land.

PERSICA, the peach, in botany. See the article PEACH.

PERSICARIA, arſmart, in botany, a genus of plants, whoſe flower is monopetalous, and cut into five ſpreading ſegments; there is no pericarpium, but the ſeed, which is ſingle, roundiſh, and acute-pointed, is contained in the corolla, which is permanent.

There is great irregularity in this genus, ſome ſpecies having only five ſtamina, and others ſix or eight, and one, two, or three ſtyles.

The perſicaria orientalis is a large plant, and cultivated in our gardens; it riſes to the height of eight or ten feet, where the ſoil is moiſt, and is furniſhed with large leaves, like thoſe of tobacco, of a bright green, and a little hairy; the branches are terminated with ſpikes of flowers of pink-colour, ſeven or eight inches long, hanging downwards. This plant is annual, and begins to ſhew its flowers about the beginning of Auguſt, and makes a beautiful appearance, until the froſts in Autumn put a ſtop thereto. The propagation of this plant is eaſy, for if the ſeeds are ſuffered to ſhed where the plants grow, they will come up in plenty in the ſpring, at which time they may be tranſplanted where they are to remain.

The ſpotted arſmart ſends forth ſtalks to the height of a foot; they are hollow, reddiſh, branched and jointed; the leaves are ſhaped like thoſe of the peach-tree,

tree, and marked with black ſpots; the flowers grow in ſpikes, and come out in July and Auguſt. It grows wild in watery, marſhy, and moiſt ditches, almoſt every where.

Another ſpecies, called by ſome water-pepper, and biting arſmart, grows in moiſt places; it is extremely hot and penerating, inſomuch that the taſte is hardly tolerable; this has made it obtain in ſcorbutic caſes, hypochondriac affections, and all diſorders ariſing from a ſluggiſh circulation of the fluids; and its diſtilled water, given in two or three ounces, is accounted a ſpecific againſt the gravel and ſtone: all authors agree, that the herb applied to old ulcers eats away proud fleſh, cleanſes, and dries them; applied as a cataplaſm to the bruiſes of horſes, it reſolves the coagulated blood; and if wounds or ulcers are waſhed with the juice, the flies will never come near them.

PERSON, an individual ſubſtance of a rational or intelligent nature. Thus we ſay, an embaſſador repreſents the perſon of his prince; and that in law, the father and ſon are reputed the ſame perſon.

PERSON, in dramatic poetry, the character aſſumed by an actor, or he who is repreſented by the player. Thus, at the head of dramatic pieces, is placed the dramatis perſonæ, or liſt of the perſons that are to appear on the ſtage.

Father Boſſu obſerves, that in the epic and dramatic poem the ſame perſon muſt reign throughout; that is, muſt ſuſtain the chief part through the whole piece, and the characters of all the other perſons muſt be ſubordinate to him.

PERSON, in grammar, a term applied to ſuch nouns or pronouns, as being either prefixed or underſtood, are the nominatives in all inflections of a verb; or it is the agent or patient in all finite and perſonal verbs.

PERSONABLE, in law, ſignifies the being able to maintain a plea in court; eſpecially in the caſe of an alien, who may be made perſonable by act of parliament.

It is alſo uſed to ſignify a capacity to receive any thing granted or given.

PERSONAL, any thing that concerns, or is reſtrained to, the perſon: thus it is a maxim in ethics, that all faults are perſonal.

PERSONAL ACTION, in law, is an action levied directly and ſolely againſt the perſon, in oppoſition to a real or mixed action.

PERSONAL GOODS, or CHATTELS, in law, ſignifies any moveable thing belonging to a perſon, whether alive or dead.

PERSONAL TYTHES, are tythes payable out of the profits obtained by a man's perſonal labour and induſtry, as in buying, ſelling, handicraft, &c.

PERSONAL VERB, in grammar, a verb conjugated in all the three perſons; thus called, in oppoſition to an impersonal verb, or that which has the third perſon only. See IMPERSONAL VERB.

PERSONALITY, in the ſchools, that which conſtitutes an individual a diſtinct perſon.

PERSONATED-FLOWERS, among botaniſts, are thoſe which reſemble the gaping mouths of certain living animals: they belong to the angioſperma order of the didynamia claſs, in botany: ſuch are the ſnap-dragon, eye-bright, cow-wheat, rhinanthus, &c.

PERSPECTIVE, that branch of optics, which teaches how to repreſent objects on a plane ſuperficies, ſuch as they would appear at a certain diſtance and height, upon a tranſparent plane perpendicular to the horizon, placed between the objects and the eye.

The foundation of perſpective may be thus conceived: ſuppoſe the pentagon A B D E F (plate LXXIII. *fig.* 7.) were to be repreſented by the rules of perſpective on the tranſparent plane V P, placed perpendicularly on the horizontal plane H R; dotted lines are imagined to paſs from the eye C to each point of the pentagon, as C A, C B, C D, &c. which are ſuppoſed in their paſſage through the plane P V, to leave their traces or veſtigia in the points *a*, *b*, *d*, &c. on the plane, and thereby to delineate the pentagon *a b d e f*; which, as it ſtrikes the eye by the ſame rays that the original pentagon A B D E F does, will be a true perſpective repreſentation of it.

The buſineſs of perſpective, therefore, is to lay down geometrical rules for finding the points *a b d e f* upon the plane; and hence, alſo, we have a mechanical method of delineating any object very accurately.

Perſpective is either employed in repreſenting the ichnographies, or ground-plots of objects; or the ſcenographies, or repreſentations of the objects themſelves. See the articles ICHNOGRAPHY and SCENOGRAPHY.

The horizontal line is that ſuppoſed to be drawn parallel to the horizon through the eye of the ſpectator; or rather, it is a line which ſeparates the heaven from the earth, and which limits the ſight. Thus A, B, (*fig.* 8.) are two pillars below the horizontal line, C D, by reaſon the eye is elevated above them; in *fig.* 3. they are ſaid to be equal with it; and in *fig.* 4. raiſed above it. Thus, according to the different points in view, the objects will be either higher or lower than the horizontal line. The point of ſight, A (*fig.* 9.) is that which makes the centrical ray on the horizontal line, *a b*; or it is the point where all the other viſual rays, D, D, unite. The points of diſtance, C, C, are points ſet off in the horizontal line, at equal diſtances, on each ſide of the point of ſight, A; and, in the ſame figure, B B repreſents the baſe line, or fundamental line; E E is the abridgment of the ſquare, of which D, D, are the ſides; F, F, the diagonal lines, which go to the points of diſtance, C, C. Accidental points, are thoſe where the objects end: theſe

may

may be caſt negligently, becauſe neither drawn to the point of ſight, nor to thoſe of diſtance, but meeting each other in the horizontal line; for example, two pieces of ſquare timber, G and H (*fig.* 10.) make the points I, I, I, I, on the horizontal line; but go not to the point of ſight K, nor to the point of diſtance C, C: theſe accidental points ſerve likewiſe for caſements, doors, windows, tables, chairs, &c.

The point of direct view, or of the front, is when we have the object directly before us; in which caſe it ſhews us only the foreſide; and, if below the horizon, a little of the top; but nothing of the ſides, unleſs the object be polygonous. The point of oblique view, is when we ſee an object aſide of us, and, as it were, aſlant, or with the corner of the eye; the eye, however, being all the while oppoſite to the point of ſight; in which caſe, we ſee the object laterally, and it preſents to us two ſides or faces. The practice is the ſame in the ſide points as in the front points; a point of ſight, point of diſtance, &c. being laid down in the one as well as in the other.

We ſhall now give ſuch rules as are of more general uſe in the practice of perſpective. 1. Let every line, which in the object, or geometrical figure, is ſtraight, perpendicular, or parallel to its baſe, be ſo alſo in its ſcenographic delineation. 2. Let the lines, which in the object return at right angles from the fore-right ſide, be drawn ſcenographically from the viſual point. 3. Let all ſtraight lines, which in the object return from the fore-right ſide, run in a ſcenographic figure into the horizontal line. 4. Let the object you intend to delineate, ſtanding on your right-hand, be placed alſo on the right-hand of the viſual point; and that on the left-hand, on the left-hand of the ſame point; and that which is juſt before, in the middle of it. 5. Let theſe lines which are (in the object) equidiſtant to the returning line, be drawn in the ſcenographic figure, from that point found in the horizon. 6. In ſetting off the altitude of columns, pedeſtals, and the like, meaſure the height from the baſe line upward, in the front, or fore-right ſide; and a viſual ray down that point in the front ſhall limit the altitude of the column or pillar, all the way behind the fore-right ſide, or orthographic appearance, even to the viſual point. This rule you muſt obſerve in all figures, as well where there is a front or fore-right ſide, as where there is none. 7. In delineating ovals, circles, arches, croſſes, ſpirals, and croſs-arches, or any other figure in the roof of any room, firſt draw ichnographically, and ſo with perpendiculars from the moſt eminent points thereof, carry it up unto the ceiling; from which ſeveral points, carry on the figure. 8. The center in any ſcenographic regular figure is found by drawing croſs lines from oppoſite angles: for the point where the diagonals croſs, is the center. 9. A ground-plane of ſquares is alike, both above and below the horizontal line; only the more it is diſtant above or below the horizon, the ſquares will be ſo much the larger or wider. 10. In drawing a perſpective figure, where many lines come together, you may, for the directing of your eye, draw the diagonals in red; the viſual lines in black; the perpendiculars in green, or other different colour, from that which you intend the figure ſhall be of. 11. Having conſidered the height, diſtance, and poſition of the figure, and drawn it accordingly, with ſide or angle againſt the baſe; raiſe perpendiculars from the ſeveral angles, or deſigned points, from the figure to the baſe, and transfer the length of each perpendicular, from the place where it touches the baſe, to the baſe on the ſide oppoſite to the point of diſtance; ſo will the diametrals drawn to the perpendiculars in the baſe, by interſection with the diagonals, drawn to the ſeveral transferred diſtances, give the angles of the figures, and ſo lines drawn from point to point will circumſcribe the ſcenographic figure. 12. If in a landſkip there be any ſtanding-waters, as rivers, ponds, and the like, place the horizontal line level with the fartheſt ſight or appearance of it. 13. If there be any houſe, or the like, in the picture, conſider their poſition, that you may find from what point in the horizontal lines to draw the front and ſides thereof. 14. In deſcribing things at great diſtance, obſerve the proportion, both in magnitude and diſtance, in draught, which appears from the object to the eye. 15. In colouring and ſhadowing of every thing, you muſt do the ſame in your picture, which you obſerve with your eye, eſpecially in objects lying near; but, according as the diſtance grows greater and greater, ſo the colours muſt be fainter and fainter, till at laſt they loſe themſelves in a darkiſh ſky-colour. 16. The catoptrics are beſt ſeen in a common looking-glaſs, or other poliſhed matter; where, if the glaſs be exactly flat, the object is exactly like its original; but, if the glaſs be not flat, the reſemblance alters from the original; and that more or leſs, according as the glaſs differs from an exact plane. 17. In drawing catoptric figures, the ſurface of the glaſs is to be conſidered, upon which you mean to have the reflection: for which you muſt make a particular ichnographical draught, or projection; which on the glaſs muſt appear to be a plane full of ſquares, on which projection transfer what ſhall be drawn on a plane, divided into the ſame number of like ſquares; which though the draught may appear very confuſed, yet the reflection of it on the glaſs will be regular, proportional, and regularly compoſed. 18. The dioptric, or broken beam, may be ſeen in a tube through a cryſtal or glaſs, which hath its ſurface cut into many others, whereby the rays of the object are broken. For to the flat of the cryſtal, or water, the rays run ſtraight; but then they break and make an angle

gle, which alſo by the refracted beams is made and continued on the other ſide of the ſame flat. 19. When theſe faces on a cryſtal are returned towards a plane placed directly before it, they ſeparate themſelves at a good diſtance on the plane, becauſe they are all directed to various far diſtant places of the ſame. See REFLECTION and REFRACTION.

PERSPECTIVE alſo denotes a kind of painting frequently ſeen in gardens, at the ends of galleries, &c. expreſly deſigned to deceive the ſight.

PERSPECTIVE-GLASS, in optics, differs from a teleſcope in this: inſtead of the convex eye-glaſs placed behind the image, to make the rays of each pencil go parallel to the eye, there is placed a concave eye-glaſs as much before it; which opens the converging rays, and makes them emerge parallel to the eye.

The quantity of objects taken in at one view with this inſtrument, does not depend upon the breadth of the eye-glaſs, as in the aſtronomical teleſcope, but upon the breadth of the pupil of the eye.

PERSPECTIVE PLANE, is the glaſs, or other tranſparent ſurface ſuppoſed to be placed between the eye and the object, perpendicularly to the horizon. It is ſometimes called the ſection, table, or glaſs.

PERSPIRATION, in medicine, the evacuation of the juices of the body through the pores of the ſkin. Perſpiration is diſtinguiſhed into ſenſible and inſenſible: and here ſenſible perſpiration is the ſame with ſweating; and inſenſible perſpiration, that which eſcapes the notice of the ſenſes; and this laſt is the idea affixed to the word perſpiration when uſed alone.

PESADE, or PESATE, in the manege, is a horſe's raiſing his fore-quarters, and bending his feet up to his body without ſtirring his hind-feet.

PESSARY, in medicine, a ſolid ſubſtance compoſed of wool, lint, or linen, mixed with powders, oils, wax, &c. made round and long like a finger, in order to be introduced into the exterior neck of the matrix, for the cure of ſeveral diſorders incident to the uterus.

This name is alſo ſometimes given to pieces of cork, or other matters thruſt up the noſtrils, &c. to prevent the entrance of ſtrong infectious ſteams.

PESTILENCE, in medicine, an epidemical, contagious, and malignant diſeaſe, popularly known by the name of plague. See the article PLAGUE.

PESTILENTIAL FEVERS, ſuch as are attended with ſome malignant quality, and approach to the nature of a plague.

PETAL, *Petala*, among botaniſts, an appellation given to the fine coloured leaves which in common compoſe the moſt conſpicuous part of the flower, by which name they are conveniently diſtinguiſhed from the common leaves of the plant, which are called folia.

According to the number of petals the corolla is compoſed of, the flower is ſaid to be monopetalous, or containing one petal; dipetalous, when it has two; tripetalous, when three, &c. See the article FLOWER.

PETARD, in the art of war, a metalline engine, ſomewhat reſembling a high-crowned hat.

The petard may be conſidered as a piece of ordnance; it is made of copper mixed with braſs, or of lead with tin; its charge is from five to ſix pounds of powder, which reaches to within three fingers-breadth of the mouth; the vacancy is filled with tow, and ſtopped with a wooden tampion, the mouth being ſtrongly bound up with cloth tied very tight with ropes. It is covered up with a madrier, or wooden plank, that has a cavity to receive the mouth of the petard, and faſtened down with ropes.

Its uſe is in a clandeſtine attack to break down gates, bridges, barriers, &c. to which it is hung; and this it does by means of the wooden plank. It is alſo uſed in countermines to break through the enemy's galleries, and give their mines vent.

The invention of petards is aſcribed to the French Huguenots, in 1579, who with them took Cahors, as D'Aubigné tells us.

PETASITES, butterbur, in botany, is comprehended by Linnæus among the tuſſilagos, or colts-feet. See the article TUSSILAGO.

The root of the common butterbur is celebrated for its cordial and alexipharmic virtues; and beſides being aperient and detergent, is preſcribed in ſuppreſſions of urine and the menſes: as alſo in the cough, aſthma, and other diſorders of the breaſt.

PETECHIÆ, in medicine, denote ſpots in the ſkin like flea-bites, which come out in malignant fevers, hence called petechial, or ſpotted fevers.

PETER, or *Epiſtle of St.* PETER, two canonical books of the New Teſtament, written by the apoſtle St. Peter, and addreſſed to thoſe Jewiſh converts who were ſcattered throughout Pontus, Galatia, &c. not only upon the perſecution raiſed at Jeruſalem, but upon former diſperſions of the Jews into thoſe places. The firſt of theſe epiſtles is principally deſigned to comfort and confirm them, under thoſe fiery trials they were then ſubject to; and to direct them how to behave in the ſeveral ſtates and relations, both of the civil and the Chriſtian life. In the ſecond epiſtle, the apoſtle proſecutes the ſame ſubject, to prevent their apoſtacy from the faith, and guard them againſt the corrupt principles of the gnoſtics, and thoſe who ſcoffed at the promiſe of Chriſt's coming.

St. PETER'S DAY, a feſtival of the Chriſtian church, obſerved on the 29th of June.

PETER-PENCE, an ancient tax of a penny on each houſe, paid to the pope.

It was called Peter-pence, becauſe collected on

the day of St. Peter *ad vincula*, and ſent to Rome; whence it was alſo called Rome-ſcot, and Rome-penny.

PETESIA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is cylindric and longer than the cup, and the limb is cut into four roundiſh obtuſe ſegments: the ſtamina are four ſubulated filaments, the length of the tube, and topped with oblong antheræ. The fruit is a globoſe, coronated, bilocular berry, containing a few roundiſh ſeeds.

PETIOLE, *Petiolum*, in botany, the ſlender foot-ſtalk which connects the leaf to the branch of a plant, whereby it is diſtinguiſhed from a peduncle, which is the footſtalk of a flower. Some alſo uſe the the word petiole for the middle rib of a leaf; the branches thereof being called rami, and the ſubdiviſions of theſe, furculi.

PETITIO PRINCIPII, in logic, the taking a thing for true, and drawing concluſions from it as ſuch; when it is really falſe, or at leaſt wants to be proved, before any inferences can be deduced from it.

PETITION, a formal ſupplication or requeſt made by an inferior to a ſuperior, eſpecially to one having juriſdiction.

PETIVERIA, in botany, a genus of plants, whoſe flower is apetalous, only the cup being coloured red has much the appearance of ſuch; it is cut into four linear, erect, obtuſe ſegments, and contains ſix ſubulated ſtamina: the ſeed is ſingle, flatted, and emarginated, and armed with a ſtyle outwardly reflexed.

PETREA, in botany, a plant which ariſes with a woody ſtalk to the height of fifteen or ſixteen feet, which is covered with a light grey bark, ſending out ſeveral long branches; theſe have a lighter bark than the ſtem, and are furniſhed with leaves at each joint, which on the lower part are placed by threes, but on the upper part they ſtand by pairs on the branches; they are about five inches long and two and a half broad in the middle, drawing to a point at each end; they are ſtiff, the ſurface rough, of a light green, having a ſtrong midrib with ſeveral tranſverſe veins. The flowers are produced at the ends of the branches, growing in looſe bunches which are nine or ten inches long, each flower ſtanding upon a ſlender peduncle about an inch long; the cup of the flower is of one leaf, deeply cut into five obtuſe ſegments about an inch long, and are of a fine blue colour, which make them more conſpicuous than the corolla, which is monopetalous and leſs than the cup, and of a whiter colour; when the flower is decayed, the germina becomes four oblong ſeeds, wrapped up in a fringed cover. This plant may be reckoned among the firſt claſs of beautiful American trees; it grows naturally in the Spaniſh Weſt-Indies, and is propagated from ſeeds which with us muſt be obtained from the places where the trees grow naturally, and ſhould be ſown on a hot bed, and when the plants are up, they ſhould be placed ſingly in ſmall pots, in good light loamy earth, and plunged into the bark bed in the hot-houſe, where they ſhould conſtantly remain.

PETRIFACTION, in phyſiology, denotes the converſion of wood, bones, and other ſubſtances into ſtone.

PETROBUSSIANS, in church-hiſtory, a religious ſect which aroſe in France and the Netherlands, about the year 1126, ſo called from their leader Peter Bruys.

They denied that children, before the uſe of reaſon, can be juſtified by baptiſm. They alſo condemned all places of public worſhip, croſſes, crucifixes; and are ſaid to have rejected the ſacrament of the euchariſt, and prayers for the dead.

PETROLEUM, alſo called rock-oil, or oil of petre, is an extremely ſubtle and penetrating fluid, and is by much the thinneſt of all the native bitumens.

Petroleum is found in rivers, in wells, and trickling down the ſides of hills along with little ſtreams of water. In ſhort, it is the moſt frequent of all liquid bitumens, and is perhaps the moſt valuable of them all in medicine. It is to be choſen the pureſt, lighteſt, and moſt pellucid that can be had, ſuch as is of the moſt penetrating ſmell and is moſt inflammable.

It is principally uſed externally, in paralytic caſes, and in pains of the limbs. The French give it internally in hyſteric complaints, and to their children againſt worms; ſome alſo give it from ten to fifteen drops in wine, for ſuppreſſion of the menſes. Theſe, however, are rather the practices of the common people than of the faculty.

PETROSA OSSA, in anatomy, a name given to the fourth and fifth bones of the cranium, called alſo oſſa temporum, and alſo oſſa ſquamoſa; the ſubſtance whereof, as their firſt and laſt names expreſs, is ſquamoſe and very hard.

PETROSOLINUM, parſley, in botany. See the article PARSLEY.

PETUNSE, in natural hiſtory, one of the two ſubſtances whereof the porcelain or china-ware is made. See PORCELAIN.

The petunſe is a coarſe kind of flint or pebble, the ſurface of which is not ſo ſmooth, when broken, as that of our common flint.

PEUCEDANUM, hog's-fennel, in botany, a genus of umbelliferous plants, the univerſal umbel is multiplex, very long and narrow, and the particular one ſpreads open; the general corolla is uniform, and each ſingle flower is compoſed of five equal, oblong, incurved petals, which are entire; there is no pericarpium, but the fruit, which is ovate and channelled on each ſide, divides into two parts, containing two ovato-oblong, compreſſed ſeeds, convex on one ſide, with three raiſed furrows,

rows, and a broad membraneous border indented at top. A ſpecies of this genus, which grows naturally in marſhy meadows in ſeveral parts of Germany, is reckoned aperient, pectoral, and uterine; the root is the only part uſed; it is accounted good to clear the lungs of tough viſcid phlegm, and thereby to help old coughs and ſhortneſs of breath; it likewiſe opens obſtructions of the liver and ſpleen, and helps the jaundice.

PEZIZA, in botany, a genus of cryptogamious plants of the fungous kind; they are of a campanulated form, with orbiculated ſeeds of a convex plane figure. This genus comprehends the cyathoides of Micheli.

PHACA, in botany, a genus of plants, whoſe flower is papilionaceous, the vexillum is ſtraight, ovate, and large; the wings are oblong, obtuſe, and ſhort; and the carina is ſhort, compreſſed and obtuſe. The fruit is an oblong inflated legumen, whoſe upper ſurture is depreſſed towards the under, and contains ſeveral kidney-ſhaped ſeeds.

PHÆNOMENON, φαινομενον, in philoſophy, denotes any remarkable appearance, whether in the heavens or on earth; and whether diſcovered by obſervation or experiments.

PHALANGIUM, ſpider-wort, in botany. See the article SPIDER-WORT.

PHALANX, in Grecian antiquity, a ſquare battalion, conſiſting of eight thouſand men, with their ſhields joined, and pikes croſſing each other; ſo that it was next to impoſſible to break it.

PHALARIS, in botany, a genus of plants whoſe flower-cup conſiſts of an uniflorous, bivalvular, membranaceous glume; the corolla is alſo a bivalvular glume, ſcarce the length of the cup; the ſtamina are three capillary filaments, topped with ovate antheræ; it hath one roundiſh compreſſed ſeed, convex on one ſide, and contained in the corolla.

PHALACROIDES, in botany, the ſame with the briza. See the article BRIZA.

PHALEUCIAN VERSE, in antient poetry, a kind of verſe which conſiſts of five feet, the firſt of which is a ſpondee, the ſecond a dactyl, and the three laſt trochees.

PHALLUS, in botany, a genus of cryptogamious plants, of the fungus kind; they are ſmooth underneath, but above are reticulated and callous.

PHANTASY, FANCY, the ſame with imagination, which ſee.

PHARISEES, a famous ſect of the Jews, who diſtinguiſhed themſelves by their zeal for the traditions of the elders, which they derived from the ſame fountain with the written word itſelf; pretending that both were delivered to Moſes from Mount Sinai, and were therefore of equal authority. From their rigorous obſervance of theſe traditions, they looked upon themſelves as more holy than other men, and therefore ſeparated themſelves from thoſe whom they thought ſinners or prophane, ſo as not to eat or drink with them; and hence, from the Hebrew word *pharis*, which ſignifies to ſeparate, they had the name of phariſees, or ſeparatiſts.

PHARMACY, the art or ſcience which teaches the election, preparation, and mixture of medicines; conſtituting one part of the therapeutic branch of medicine, the objects of which are all natural bodies.

PHARNACEUM, in botany, a genus of plants, whoſe flower hath no corolla, but the cup reſembles one, being coloured on the inſide and its edges thin; it is cut into five ovate concave ſegments, which are equal and perſiſtent: the ſtamina are five ſubulated filaments, the length of the cup, and topped with antheræ, which are bifid at their baſe: the fruit is an ovate, obſcurely three-cornered, having three cells and three valves, containing a great number of depreſſed, orbicular, ſhining ſeeds, ſurrounded with a margin.

PHARYNX, in anatomy, the upper part of the œſophagus. See the article ŒSOPHAGUS.

PHASEOLUS, the kidney or French bean, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is cordated, obtuſe, emarginated, and reclined, with reflexed ſides; the alæ are ovate, the ſame length as the vexillum, and ſtand upon long ungues; the carina is narrow, and revolves ſpirally, in a contrary direction to the ſun; the filaments are ten in number, nine of which are carinated and ſpiral, and topped with ſimple antheræ: the fruit is a long, ſtraight, coriaceous legumen, ending in an obtuſe point, containing oblong, compreſſed, kidney-ſhaped ſeeds.

There are ſeveral kinds of kidney-beans cultivated for culinary purpoſes; as the liver-coloured bean, the Batterſea-bean, the Canterbury dwarf-bean, the ſpeckled dwarf-bean, and thoſe which require ſupport; ſuch are the white and ſcarlet bloſſomed beans, &c.

French-beans are propagated from the ſeeds, and are generally planted in rows, at about three inches aſunder, and about an inch deep, excepting the larger ſorts, which ſhould have a greater diſtance. The firſt ſeaſon for ſowing them is about the latter end of April, and the laſt in July; but there ſhould be intermediate ſowings in May and June, to continue the ſupply of the table, as they will not laſt above three weeks in gathering, particularly in hot dry weather.

The uſe of kidney-beans (or rather the pods) as a food, is ſo well known, as to be quite unneceſſary to mention it; they are opening, emollient, reſolvent, and promote urine, and they generally agree with moſt conſtitutions; the meal of the ſeed is ſometimes mixed in emollient cataplaſms.

PHASES, φασις, in aſtronomy, the ſeveral appearances or quantities of illumination of the moon, Venus, Mercury, and the other planets; or the ſeveral manners wherein they appear illuminated by the

the ſun. See the articles MOON, VENUS, MERCURY, &c.

PHASMATA, in phyſiology, certain appearances ariſing from the various tinctures of the clouds, by the rays of the heavenly luminaries, eſpecially the ſun and moon. Theſe are infinitely diverſified by the different figures and ſituation of the clouds, and the appulſes of the rays of light.

PHEASANT, *Phaſianus*, in ornithology, a genus of birds of the order of the gallinæ, with the ſpace about the eyes naked.

PHEASANT'S-EYE, *Adonis*, in botany. See the article ADONIS.

PHELLANDRIUM, in botany, a genus of umbelliferous plants, the general corolla of which is almoſt uniform, and the proper flowers are unequal, and compoſed each of five acuminated, heart-ſhaped, inflexed petals, with five capillary filaments, topped with roundiſh antheræ: the fruit is naked, ſmooth, and crowned with the perianthium and two piſtils, diviſible into two parts, which form two ovate ſmooth ſeeds.

PHEONS, in heraldry, the barbed heads of darts, arrows, or other weapons.

PHILADELPHUS, *Syringa*, or mock-orange, in botany, a ſhrub, having a flexible creeping root, from which ariſe ſeveral upright ſtems and branches, covered with an aſh-coloured bark, with a white ſpongy pith; the leaves are oblong, large, pointed, veiny, a little wrinkled, crenated on their edges, with their ſurface rough, and having the taſte of a freſh cucumber: the flowers grow in looſe bunches at the tops of the branches, each ſtanding on a ſhort peduncle; they are each compoſed of four white petals, which ſpread open, with a great number of ſtamina ſurrounding the ſtyle: the flowers have a ſtrong ſcent, which, at ſome diſtance, reſembles the perfume of orange-flowers, but when near, the ſmell is too powerful for many perſons. It blows in May and June, but is ſeldom ſucceeded by ſeeds in this country.

This ſhrub riſes to the height of ſeven or eight feet, and is eaſily propagated by taking off the ſuckers in autumn, which may be planted in a nurſery for two or three years, after which they may be tranſplanted where it is intended they ſhould remain, which is commonly in wilderneſſes, among other ſhrubs of the ſame growth.

PHILIPPICS, φιλιππικοι λογοι, in literature, a name given to the orations of Demoſthenes againſt Philip king of Macedon; being eſteemed the maſter-pieces of that great orator.

Philippic is alſo a term applied to the fourteen orations of Cicero againſt Mark Antony.

PHILIPPINES, a religious ſociety of young women, at Rome; ſo called from their taking St. Philip de Neri for their protector.

They conſiſt of a hundred poor girls, who are brought up till they are of age to be married, or become nuns, under the direction of ſome religious women, who teach them to read, write, and work, and inſtruct them in the duties of Chriſtianty.

They wear a white veil, and a black croſs on their breaſts.

PHILLYREA, mock-privet, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; it has ſcarce any tube, but the limb is divided into four revolute acute ſegments: it hath two ſtamina, and the fruit is a globoſe unilocular berry, incloſing one large round ſeed.

Phillyrea is an evergreen-ſhrub, and propagated either from ſeeds or layers, in autumn.

The leaves and bark of this ſhrub are ſaid to be aſtringent, and good in ulcers of the mouth; but they are little regarded in the preſent practice.

PHILOLOGY, φιλολογια, a ſcience, or rather an aſſemblage of ſeveral ſciences, conſiſting of grammar, rhetoric, poetry, antiquities, hiſtory, and criticiſm.

PHILOMATHES, a lover of learning or ſcience.

PHILONIUM, in pharmacy, a kind of ſomniferous anodyne opiate, taking its name from Philo, the inventor.

PHILOSOPHER, φιλοσοφος, a perſon verſed in philoſophy; or one who makes profeſſion of, or applies himſelf to, the ſtudy of nature and morality. See the article PHILOSOPHY.

PHILOSOPHIC, or PHILOSOPHICAL, ſomething that relates to philoſophy. See the articles PHILOSOPHY and PHILOSOPHER.

PHILOSOPHICAL-EGG, among chemiſts, a thin glaſs body, or bubble, of the ſhape of an egg, with a long neck or ſtem, uſed in digeſtions.

PHILOSOPHY, φιλοσοφια, the knowledge or ſtudy of nature and morality, founded on reaſon and experience.

Philoſophy, among the ancients, was uſed in various ſenſes: for, 1. It ſometimes was uſed for univerſal knowledge, viz. of all things human and divine. 2. In a ſtricter notion, for the contemplation of nature only; and in this ſenſe, a philoſopher was called, by Plato, φιλος της φυσεως, i. e. a friend and lover of nature. 3. Sometimes for ethics, or the doctrine of manners, which we call moral philoſophy. 4. It included alſo the mathematical arts and diſcipline, eſpecially arithmetic and geometry. 5. The doctrine of exiſtence, or *being* in the abſtract, called metaphyſics. 6. For the knowledge τα πρωτα καλα, i. e. of the prime or chief good, viz. God; and this was their prima philoſophia, or theology. 7. It was ſometimes applied to logics or dialectics, which gave rules for reaſoning about the nature of things.

Philoſophy may be divided into three parts, intellectual, moral, and phyſical. The intellectual part comprizes logics and metaphyſics; the moral part contains the laws of nature and nations; and, laſtly,

laſtly, the phyſical part comprehends the doctrine of bodies animate or inanimate. Theſe, with their various ſubdiviſions, will take in the whole of philoſophy. See Logics, Metaphysics, Ethics, Politics, &c.

Wolfius makes the three parts of philoſophy to be the doctrine of God, the human ſoul, and of bodies: however, when he ſubdivides, and comes to treat of the ſeveral branches ſeparately, his diviſions readily come under the three heads intellectual, moral, and phyſical, before-mentioned.

For the method of philoſophizing, or the rules for that purpoſe, as eſtabliſhed by Sir Iſaac Newton, See the article Experimental Philosophy.

PHIMOSIS, in medicine, a diſorder of the penis, in which the prepuſe is rendered ſo ſtrict or tenſe, that it cannot be drawn back over the glands.

PHLEBOTOMY, in ſurgery, the opening a vein with a proper ſharp-edged and pointed inſtrument of ſteel, in order to let out a proper quantity of blood, either for the preſervation or recovery of a perſon's health. See the article Disease.

PHLEGM, φλεγμα, in the animal œconomy, one of the four humours whereof the ancients ſuppoſed the blood to be compoſed. See the article Blood.

The chemiſts make phlegm, or water, to conſiſt of an elementary body, the characters of which are fluidity, inſipidity, and volatility: and yet quick-ſilver has all theſe, which nobody pretends to be phlegm. See the article Water.

PHLEGMAGOGUES, in pharmacy, ſuch medicines as purge off phlegm: ſuch are hermodactils, agaric, turbith, jalap, &c. See the article Hydragogues.

PHLEGMATIC, among phyſicians, an appellation given to that temperament, or habit of body, wherein phlegm is predominant; which gives riſe to catarrhs, coughs, &c. See the articles Catarrh and Cough.

PHLEGMON, in ſurgery, denotes an external inflammation and tumour, attended with a burning heat, &c. See the article Inflammation.

PHLEUM, in botany, a genus of plants, the corolla of which conſiſts of two valves; and the ſeed, which is ſingle, is included within the calyx and corolla.

PHLOMIS, Jeruſalem ſage, in botany, a genus of plants, whoſe flower is monopetalous and labiated; the tube is oblong; the upper lip is ovate, compreſſed, forked, and incumbent; the under is trifid; the middle ſegment is large, bilobate, and obtuſe: it hath four triquetrous ſeeds placed in the bottom of the cup.

The leaves of this plant are accounted aſtringent and vulnerary.

PHLOX, baſtard lichnis, in botany, a genus of plants, whoſe flower is monopetalous and faucer-ſhaped; the tube is cylindraceous and longer than the cup, it is narrow at the baſe and incurved; the limb is plane, and divided into five roundiſh, equal, obtuſe ſegments, ſhorter than the tube: the fruit is an ovate trigonal capſule, having three cells, each containing an oval ſeed.

This genus is the ſame with the lychnidea of Dillenius.

PHŒNIX, in aſtronomy, one of the conſtellations of the ſouthern hemiſphere, unknown to the ancients, and inviſible in our northern parts: it is ſaid to conſiſt of thirteen ſtars.

It took its name from that of a famous bird among the ancients, but generally looked upon by the moderns as fabulous.

The ancients ſpeak of this bird as ſingle, or the only one of its kind: they deſcribe it as of the ſize of an eagle; its head finely creſted with a beautiful plumage, its neck covered with feathers of a gold colour, and the reſt of its body purple, only the tail white, and the eyes ſparkling like ſtars; they hold, that it lives five or ſix hundred years in the wilderneſs; that, when thus advanced in age, it builds itſelf a pile of ſweet wood and aromatic gums, and fires it with wafting of its wings, and thus burns itſelf; and that from its aſhes ariſes a worm, which in time grows up to be a phœnix.

Phœnix, the great-palm, or date, in botany, a tree which riſes to a great height; the ſtalks are generally full of rugged knots, which are the veſtiges of the decayed leaves; the trunk is not ſolid, the center being filled with pith, round which is a tough bark, full of ſtrong fibres while young, but as the tree grows old, this bark hardens and becomes ligneous; to this bark the leaves are cloſely joined, which in the center riſe erect, being cloſely folded or plaited together; but after they have advanced above the vagina, which ſurrounds them, they expand very wide on every ſide of the ſtem, and as the older leaves decay, the ſtalk advances in height: the leaves, when grown to a ſize for bearing fruit, are ſix or eight feet long, and may be termed branches, for the trees have no other; theſe have narrow long leaves, or pinnæ, ſet on alternately their whole length; the ſmall leaves, or lobes, are, toward the baſe, three feet long, and little more than an inch broad; they are cloſely folded together when they firſt appear, and are wrapped round with brown fibres, or threads, which fall off as the leaves advance, making way for them to expand; theſe never open flat, but are hollow like the keel of a boat, with a ſharp ridge on their outſide; they are very ſtiff, and when young, of a bright green, ending with a ſharp black ſpine.

Theſe trees have male flowers on different plants from thoſe which produce the fruit; and there is a neceſſity for ſome of the male trees to grow near the female ones, to render them fruitful, or at leaſt to impregnate the ovary of the ſeed, without which, the ſtones which are taken out of the fruit will not

grow. Moſt of the old authors who have mentioned this trees, affirm, that unleſs the female, or fruit-bearing palm-trees, have the aſſiſtance of the male, they are barren; therefore, in ſuch places where there are no male trees near the female, the inhabitants cut off the bunches of male flowers, when they are juſt opened, and carry them to the female trees, placing them on the branches near the female flowers to impregnate them, which they all agree has the deſired effect, rendering the trees fruitful which would otherwiſe have been barren.

Labat, in his account of America, mentions a ſingle tree of this kind growing near a convent, in Martinico, which produced a great quantity of fruit, that came to maturity enough for eating; but as there was no other tree of this kind in the iſland, they were deſirous of propagating it, and accordingly planted great numbers of the ſtones, for ſeveral years, but not one of them grew; therefore, after having made ſeveral trials without ſucceſs, they were obliged to ſend to Africa, where theſe plants grew in plenty, for ſome of the fruit; the ſtones of which they planted, and raiſed many plants. He then conjectures, that the ſingle tree, before-mentioned, might be probably ſo far impregnated by ſome neighbouring palm-tree of other ſpecies, as to render it capable of ripening the fruit, but not ſufficient to make the ſeeds prolific.

The flowers of both ſexes come out in very long bunches from the trunk, between the leaves, and are covered with a ſpatha, or ſheath, which opens and withers; thoſe of the male have ſix ſhort filaments, with narrow four-cornered antheræ, filled with farina; the female flowers have no ſtamina, but have a roundiſh germen, which afterwards becomes an oval berry, with a thick pulp, incloſing a hard oblong ſtone, with a deep furrow, running longitudinally.

Theſe plants grow in great plenty in Africa, alſo in Arabia, Syria, Perſia, and Greece. The dates, or fruit of the palm, are diſtinguiſhed according to their degrees of ripeneſs; thoſe are beſt which are large, full, fat, and of a yellowiſh colour: they are ſomewhat aſtringent until thoroughly ripe, and are then much of the ſame nature as figs.

They are ſaid to be good in hoarſeneſs, infarctions of the lungs, and ſandy obſtructions of the reins and bladder; they ſtrengthen the ſtomach, ſtop looſeneſſes, and corroborate the inteſtines: they are alſo good in diſeaſes of the breaſt; and the ſtones are reckoned very diuretic, and good in ſtranguries. Outwardly, dates are uſed ſometimes in ſuppurative cataplaſms.

PHOLAS, a ſhell-fiſh of the multivalve kind, compoſed of five pieces, three of which are very ſmall, ſo that they ſeem, to a ſuperficial obſerver, to be made up of only two ſhells.

PHOLIS, in natural hiſtory, a name given to the gypſums of a bright appearance.

PHONICS, φωνιχη, the doctrine or ſcience of ſounds, otherwiſe called acouſtics. See the article SOUND.

PHOSPHORUS, in phyſiology, a denomination given to all bodies which ſhine and ſeem to burn, without having any degree of heat.

Chemiſtry, ſays Dr. Shaw, hath ſcarce afforded any thing more ſurpriſing than the common phoſphorus. To ſee letters traced with this matter become luminous in the dark, images and the bodies of men to blaze with light, and abundance of the like experiments, performed by means of phoſphorus, muſt awaken the curioſity of theſe who have ſeen theſe experiments, and render them deſirous of being acquainted with the method of preparing it. The preparation, even to this day, is kept as a ſecret in few hands, and the matter ſold at a very high price. Whence we apprehend, it would be no unacceptable preſent to the world, to render this commodity cheaper, and diſcover its farther uſes.

The ſucceſsful method of preparing the phoſphorus of urine, is this: evaporate any quantity of freſh urine over a gentle fire, to a black and almoſt dry ſubſtance; then, with two pounds thereof, thoroughly mix twice its weight of fine ſand; put this mixture into a ſtrong-coated ſtone long-neck; and having poured a quart or two of clear water into a large receiver, join it to the long-neck, and work it in a naked fire: let the heat be ſmall for the firſt two hours; then increaſe it gradually to the utmoſt violence; and continue this for three or four hours ſucceſſively: at the expiration of which time, there will paſs into the receiver a little phlegm and volatile ſalt, much black and fœtid oil, and, laſtly, the matter of phoſphorus, in form of white clouds, which either ſtick to the ſides of the receiver, like a fine yellow ſkin, or fall to the bottom in form of ſmall ſand. Now let the fire go out, but let the receiver continue till all be cold, leſt the phoſphorus take fire on admiſſion of the air.

To reduce theſe ſmall grains into one piece, put them into a little tin ingot-mould, with water; heat the ingot to make the grains melt together; then add cold water, till the matter is congealed into one ſolid ſtick, like bees-wax; which being cut into ſmall pieces fit to enter the mouth of a vial, may be preſerved by water, and keeping the glaſs cloſe ſtopped. If the glaſs were not to be ſtopped, the phoſphorus would turn black on its ſurface, and at length be ſpoiled.

PHOTINIANS, a ſect of Chriſtians in the fourth century, ſo called from Photinus, their chief, who was biſhop of Sirmich, and maintained that Jeſus Chriſt was true man, but not true God, nor born before all ages; and that he only began to be Chriſt when the Holy Ghoſt deſcended upon him in the river Jordan. Theſe doctrines were condemned in ſeveral aſſemblies, and particularly by the Arians, in a ſynod held at Sirmich in the year 351.

PHRASE, φρασις, in grammar, a manner of ſpeech peculiarly adapted to certain occaſions, arts, languages, &c.

Sometimes the term phraſe is uſed for a ſhort ſentence. See SENTENCE.

PHRASEOLOGY, in matters of literature, a collection of the phraſes, and elegant expreſſions, in any language.

PHRENETIC VESSELS, in anatomy, the nerves, arteries, and veins which are ſpread over the diaphragm. The phrenetic nerves ariſe from the cervival ones; the phrenetic arteries ariſe out of the deſcending aorta, and are diſtributed through the diaphragm and pericardium; and the two phrenetic veins diſcharge their contents into the vena cava.

PHRENSY, φρενιτις, in medicine, an inflammation of the membranes of the brain, attended with an acute fever and delirium.

This diſeaſe, ſays Arbuthnot, requires the ſpeedieſt applications of all others; profuſe hæmorrhages of the noſe often reſolve it; and copious bleeding in the temporal arteries, is the moſt efficacious remedy. The diet ſhould be water-gruel, acidulated; and the drink barley-water, ſmall-beer, or the decoction of tamarinds.

According to Boerhaave, varices of the veins, or the bleeding piles, are beneficial; a looſeneſs is likewiſe good; and a violent cough, or hæmorrhage, often put an end to the diſeaſe. He therefore adviſes plentiful bleeding, through a large orifice, or to open ſeveral veins at the ſame time, as the jugular, frontal, and a vein in the foot.

PHRYMA, in botany, a genus of plants, producing monopetalous ringent flowers; the tube of the corolla is the ſame length with the cup; the upper lip is ſhort, ovate, and emarginated, and the under one is large, patent, and trifid; there is no pericarpium, but the cup, which is furrowed and connivent, contains a ſingle oblong ſeed, furrowed on one ſide.

PHTHIRIASIS, φθειριασις, in medicine, the pedicularis morbus, or louſy diſeaſe, is moſt incident to children, though adults are not wholly exempt from it.

Cleanneſs and wholeſome food are beſt for preventing this diſorder, which may be cured by waſhing the body with a lixivium of wormwood, ſtaves-acre, leſſer centaury, and oak-aſhes; adding ſome common ſalt. All the bitters, ſour and ſalt things, are here recommended; as is alſo mercury, which infallibly deſtroys theſe vermin; but it ought to be uſed with great caution, even by adults, and ſhould never be uſed in applications to children.

Etmuller adviſes the head to be waſhed with a lixivium, in which has been boiled the ſeeds of ſtaves-acre, and afterwards anointed with a liniment made of two drams of oil of ſpike, half an ounce of the oil of bitter almonds, and ſix drams of the oil of tobacco, which will deſtroy thoſe animals in one night's time. The powder of Indian berries, ſprinkled on the head, alſo effectually deſtroys them. Black ſoap is an infallible remedy for deſtroying crab-lice lodged in the groins of adults.

PHTHISIS, φθισις, a ſpecies of conſumption, ariſing from an ulcer of the lungs. See the article CONSUMPTION.

PHYGETHLON, in ſurgery, a broad, but not much elevated tumour, of the ſame nature with the bubo. See the article BUBO.

PHYLACTERY, in antiquity, a charm, or amulet, which being worn, was ſuppoſed to preſerve people from certain evils, diſeaſes, and dangers. See the article AMULET.

The Jews were remarkable for wearing phylacteries of parchment, in the form of ſlips or rolls, wherein were written certain paſſages of the law: theſe they wore upon their foreheads, and upon the wriſts of their left arms. The modern Jews think themſelves under no obligation to this practice, which they obſerve only at morning prayers.

PHYLICA, in botany, a genus of plants, whoſe flowers are collected in a diſc; the proper ones are compoſed of five acuminated ſquamulæ, with five ſmall ſtamina. The fruit is a roundiſh trilobate capſule, having three cells, each containing a roundiſh ſolitary ſeed, gibbous on one ſide, and anglular on the other.

PHYLLANTHUS, in botany, a genus of plants, producing male and female flowers, which have no petals; the cup is monophyllus, bell-ſhaped, and divided into ſix ſegments, and contains in the male flower three filaments, which join at the baſe, ſpreading aſunder at the top, and terminated with twin antheræ; the female flower has an angular nectarium ſurrounding the germen. The fruit is a roundiſh three-furrowed capſule, with three cells, each containing a ſingle roundiſh ſeed.

PHYLLIS, in botany, a plant which riſes with a ſoft ſhrubby ſtalk about two or three feet high, of an herbaceous colour, and full of joints, ſending out ſeveral ſmall ſide branches towards the top; theſe are furniſhed with ſpear-ſhaped leaves, of a lucid green on their upper ſide, but pale underneath; they have no foot-ſtalk, but ſit cloſe to the branches by threes. The flowers are produced at the end of the branches in looſe panicles; they are ſmall, and of an herbaceous colour, and cut into five parts to their baſe, and reflexed. The fruit is of a turbinated, obtuſe, angular figure, which ſplits in two parts when ripe, each containing one ſeed, flat on the inſide, and convex and angular on the outſide. It flowers in June, and the ſeeds ripen in autumn.

This plant is the bupleuroides of Boerhaave, and the valerianella of Dillenius.

PHYLLONA, in botany, a genus of moſſes, conſiſting only of a thin membranaceous matter, reſembling in ſome degree a leaf; whence the name. See the article MOSS.

PHY-

PHYSIC, φυσικη, the ſame with medicine. See MEDICINE.

PHYSIC-NUT, in botany. See the articles JATROPHA and CROTON.

PHYSICAL, ſomething relating to nature. See the articles NATURE and NATURAL PHILOSOPHY.

PHYSICIAN, a perſon who profeſſes medicine, or the art of healing diſeaſes.

PHYSICS, a denomination ſometimes given to natural philoſophy. See the article NATURAL PHILOSOPHY.

PHYSIOGNOMONICS, among phyſicians, denotes ſuch ſigns as being taken from the countenance, ſerve to indicate the ſtate, diſpoſition, &c. both of the body and mind: and hence the art of reducing theſe ſigns to practice is termed phyſiognomy, than which nothing can be more precarious, in ſo far as it reſpects the characters of people, accuſtomed by education and practice to diſſemble their ſentiments.

PHYSIOLOGY, properly denotes a diſcourſe of nature, and natural bodies; or, it is that part of natural philoſophy which treats of the various phænomena of nature in a ſcientifical and ſpeculative way; in which ſenſe, neither chemiſtry nor experimental philoſophy are included under it. However, as experiments ought always to precede any reaſonings concerning the natures and properties of natural bodies, we have given the rules to be obſerved in drawing concluſions from them under the article EXPERIMENTAL PHILOSOPHY.

If we take a view of the ſeveral phænomena, and compare them together, we may obſerve ſome likeneſs and conformity between them. For example, in the falling of a ſtone to the ground, in the riſing of the ſea towards the moon, in coheſion and cryſtallization, there is ſomething alike; namely, an union or mutual approach of bodies: ſo that any one of theſe, or the like phænomena, may not ſeem ſtrange or ſurpriſing to a man who has nicely obſerved and compared the effects of nature: for that only is thought ſo which is uncommon, or a thing by itſelf, and out of the ordinary courſe of our obſervation. That bodies ſhould tend towards the center of the earth is not thought ſtrange, becauſe it is what we perceive every moment of our lives; but that they ſhould have a like gravitation towards the center of the moon, may ſeem odd and unaccountable to moſt men, becauſe it is diſcerned only in the tides; but as a philoſopher, whoſe thoughts take in a larger compaſs of nature, having obſerved a certain ſimilitude of appearances, as well in the heavens as the earth, that argue innumerable bodies to have a mutual tendeney towards each other, which he denotes by the general name attraction, whatever can be reduced to that, he thinks juſtly accounted for; and thus he explains the tides by attraction. See the articles ATTRACTION and TIDE.

If therefore we conſider the difference there is betwixt natural philoſophers and other men, with regard to their knowledge of the phænomena, we ſhall find it conſiſts only in a greater largeneſs of comprehenſion; whereby analogies, harmonies, and agreements are diſcovered in the works of nature, and the particular effects explained; that is, reduced to general rules, which rules, grounded on the analogy and uniformneſs obſerved in the production of natural effects, are moſt agreeable and ſought after by the mind; for that, they extend our proſpect beyond what is preſent and near to us, and enable us to make very probable conjectures touching things that may have happened at very great diſtances of time and place, as well as to predict things to come; which ſort of endeavour towards omniſcience, is much affected by the mind.

Among phyſicians, the term phyſiology denotes the hiſtory of the human body and its ſeveral conſtituent parts, with their relations and functions.

PHYTEUMA, in botany, a genus of plants whoſe flower is monopetalous and ſtellated, with five filaments topped with oblong antheræ. The fruit is a roundiſh trilocular capſule, containing many roundiſh ſmall ſeeds.

PHYTOLACCA, American nightſhade, in botany, a genus of decandrious plants, whoſe flower conſiſts of five roundiſh, concave, ſpreading, perſiſtent petals: the fruit is an orbiculated depreſſed berry, with ten longitudinal furrows, and the ſame number of cells, each containing a ſmooth kidney-ſhaped ſeed. It is very common in our North-American plantations; and is cultivated in England for the beauty of its flowers: it may be propagated by ſowing the ſeeds in the ſpring upon a bed of light rich earth, and when the plants are come up, they ſhould be moved into the borders of large gardens, allowing them room enough to grow, for they become very large. The planters take a ſpoonful or two of the juice of the root as a purge, and that very frequently. The berries are full of a purple juice, which gives a fine tincture to paper, but will not laſt long, if there could be a method of fixing the dye, it might be made very uſeful.

PHYTOLOGY, a diſcourſe concerning the kinds and virtues of plants.

PIA MATER, in anatomy, the third tunic or membrane of the brain, placed immediately under the tunica arachnoides, and cloſely and firmly connected to the brain: it not only extends over the whole ſurface of the brain, but inſinuates itſelf into all its cavities, and is carried down to the bottom of all its furrows. It covers alſo the ſpinal marrow, and all the nerves, and adheres alſo to the tunica arachnoides very cloſely and firmly, in the upper part of the head; but much leſs ſo below, with the dura mater.

PIASTER, a Spaniſh coin, more ordinarily called a piece of eight.

PICA, in zoology, the largeſt animal of the mus, or mouſe-kind, being as big as a pig of a week old: it is of a brown colour ſpotted with grey, and with a white belly; the upper lip is divided, and a little longer than the under one; the ears are ſhort, and obtuſe; the body is thick and fleſhy, and the legs ſhort, eſpecially the fore ones.

PICA, in medicine, a depravation of appetite, which makes the patient long for what is unfit for food, or incapable of nouriſhing, as chalk, aſhes, coals, plaſter, lime, &c.

PICARDS, a ſect ſo called from their leader, one Picard, a Fleming, who, about the beginning of the fifteenth century, improved upon the error of the Adamites, in reſpect to nakedneſs; and who pretended that he was ſent into the world, as another Adam, to reſtore the law of nature, which, he ſaid, conſiſted principally of two things, a community of women, and a nakedneſs of all the parts of the body.

PICKAGE, or PICCAGE, an antient cuſtom or duty paid at fairs and markets, for breaking the ground, and pitching up ſtalls or ſtandings.

PICKLE, a brine or liquor, commonly compoſed of ſalt, vinegar, &c. ſometimes with the addition of ſpices, wherein meat, fruit, and other things are preſerved and ſeaſoned. The ſame name is alſo given to any vegetable production prepared in pickle.

The methods of pickling the various ſorts of vegetables, and even thoſe of the ſame kind, are very different: we ſhall therefore content ourſelves with giving one out of the numerous methods of pickling walnuts: Take walnuts before the ſhell is grown hard, ſcald them, and rub off the outer ſkin; then put them into water and ſalt for nine or ten days, ſhifting them every other day, and keeping them cloſe covered from the air; then dry them, and prepare the pickle as follows: for half a hundred of large walnuts, take two quarts of white-wine vinegar; long pepper, black-pepper, and ginger, of each half an ounce; cloves, mace, and nutmegs, of each a quarter of an ounce: pound the ſpice, and with it a ſpoonful of muſtard-ſeed; ſtrew this between every layer of walnuts, pour the liquor boiling hot upon them, and keep them cloſe ſtopped.

PIQUEERING, PICKEERING, or PICKEROONING, a flying war or ſkirmiſh made by ſoldiers detached from two armies by pillage, or before a main battle begins.

PICQUET, a celebrated game at cards played between two perſons, with only thirty-two cards; all the duces, threes, fours, fives and ſixes being ſet aſide.

PICRIS, in botany, a genus of plants, whoſe flower conſiſts of a double cup, with a compound imbricated, uniform corolla; the proper flowers are hermaphrodite, monopetalous, ligulated, linear, truncated, and quinquedentated; there is no pericarpium, but the ſeeds, which are ſolitary, ſentricoſe, obtuſe, and crowned with down, are contained in the cup. This genus comprehends the helminthotheca of Vaillant.

PICTS-WALL, in antiquity, a wall begun by the emperor Adrian, on the northern bounds of England; to prevent the incurſions of the Picts and Scots. It was firſt made only of turf, ſtrengthened with paliſadoes, till the emperor Severus coming in perſon into Britain, built it with ſolid ſtone. This wall, part of which ſtill remains, begun at the entrance of Solway-frith in Cumberland, and running N. E. extended to the German ocean.

PICTURE, a piece of painting, or a ſubject repreſented in colours, on wood, convas, paper, or the like.

PIECE, in commerce, ſignifies ſometimes a whole, and ſometimes a part of the whole. In the firſt ſenſe, we ſay a piece of cloth or velvet, &c. meaning a certain quantity of yards regulated by cuſtom; being yet intire, and not cut. In the other ſignification we ſay a piece of tapeſtry; meaning a diſtinct member wrought apart, which, with ſeveral others, make one hanging.

PIECE, in matters of money, ſignifies ſometimes the ſame thing with ſpecies; and ſometimes by adding the value of the pieces, it is uſed to expreſs ſuch as have no other particular name.

PIECE is alſo a kind of money of account, or rather a manner of accounting uſed among the negroes on the coaſt of Angola in Africa. See the article MONEY.

PIECE, in heraldry, denotes an ordinary or charge. See the article ORDINARY.

PIECES, in the military art, include all ſorts of great guns and mortars. Battering pieces are the larger ſort of guns uſed at ſieges for making the breaches, ſuch as the twenty-four pounder, and culverine, the one carrying twenty-four, and the other an eighteen pound ball. Field-pieces are twelve-pounders; demiculverines, ſix-pounders, ſakers, minions, and three-pounders, which march with the army, and encamp always behind the ſecond line, but in the day of battle are in the front. A ſoldier's firelock is likewiſe called his piece.

PIEDOUCHE, in architecture, a little ſtand or pedeſtal, either oblong or ſquare, enriched with mouldings, ſerving to ſupport a buſt, or other little figure.

PIEDROIT, in architecture, a pier, or ſquare kind of pillar, part whereof is hid within a wall. The only thing wherein it differs from a pilaſter is, that the latter has a regular baſe and capital, which the other wants. See PILASTER.

This term is alſo uſed for part of the ſolid wall annexed to a door or window, comprehending the door-poſt, chambranel, tableau, leaf, &c.

PIEPOWDER-COURT, or PEDES PULVERISATI, a court held in fairs for doing juſtice to buyers and ſellers, and redreſſing diſorders there committed.

PIER, or PEER, in building, denotes a maſs of ſtone, &c. oppoſed by way of fortreſs againſt the force of the ſea, or a great river, for the ſecurity of ſhips that lie at harbour in any haven.

It is alſo uſed in architecture for a kind of pilaſter, or buttreſs, raiſed for ſupport, ſtrength, and ſometimes for ornament.

PIERCEA, in botany, ſee the article REVINIA.

PIERCED, PERCE, in heraldry, is when any ordinary is perforated, or ſtruck through, ſhewing, as it were, a hole in it, which muſt be expreſſed in blazon, as to its ſhape: thus if a croſs have a ſquare hole, or perforation in the centre, it is blazoned ſquare-pierced, which is more proper than quarterly-pierced, as Leigh expreſſes it. When the hole or perforation is round, it muſt be expreſſed round-pierced; if it be in the ſhape of a lozenge, it is expreſſed pierced lozenge-ways. All piercings muſt be of the colour of the field, and when ſuch figures appear on the centre of a croſs, &c. of another colour, the croſs is not to be ſuppoſed pierced, but the figure on it is a charge, and muſt be accordingly blazoned.

PIETISTS, a religious ſect ſprung up among the proteſtants of Germany, ſeeming to be a kind of mean between the quakers of England, and the quietiſts of the Romiſh church. See the article QUAKERS, &c.

They deſpiſe all ſorts of eccleſiaſtical polity, all ſchool theology, and all forms and ceremonies, and give themſelves up to contemplation and the myſtic theology.

PIG, in zoology, the young of the hog kind. See the article HOG.

PIG *of Lead*, the eighth part of a fother, amounting to two hundred and fifty pounds weight.

PIGEON, in ornithology. See the article COLUMBA.

PIGEON-HOUSE, a houſe erected full of holes within for the keeping, breeding, &c. of pigeons, otherwiſe called a dove-cote.

PIGMENTS, *Pigmenta*, preparations uſed by painters, dyers, &c. to impart colours to bodies, or to imitate particular colours.

PIGMY, or PYGMY. See PYGMY.

PIKE, an offenſive weapen, conſiſting of a ſhaft of wood, twelve or fourteen feet long, headed with a flat-pointed ſteel, called the ſpear. The pike was a long time in uſe among the infantry, to enable them to ſuſtain the attack of the cavalry, but it is now taken from them, and the bayonet, which fixes on at the end of the carabine, is ſubſtituted in its place. Yet the pike ſtill continues the weapon of foot-officers, who fight pike in hand, ſalute with the pike, &c.

PILASTER, in architecture, a ſquare column, ſometimes inſulated, but more frequently let within a wall, and only ſhewing a fourth or fifth part of its thickneſs.

The pilaſter is different in different orders: it borrows the name of each, and has the ſame proportions, and the ſame capitals, members and ornaments with the columns themſelves. Pilaſters are, however, uſually made without either ſwelling or diminution, and as broad at top as at the bottom; though ſome of the modern architects, as M. Manſard, &c. diminiſh them at the top, and even make them ſwell in the middle, like columns, particularly when placed behind columns.

PILE, in antiquity, a pyramid built of wood, on which the bodies of the deceaſed were laid in order to be burned.

PILE, in building, is uſed for a large ſtake rammed into the ground in the bottom of rivers, or in marſhy land, for a foundation to built upon.

Pile is alſo uſed among architects for a maſs of building.

PILE, in coinage, denotes a kind of puncheon, which, in the old way of coining with the hammer, contained the arms, or other figure, and inſcription, to be ſtruck on the coin.

Accordingly, we ſtill call the arms-ſide of a piece of money, the pile; and the head, the croſs; becauſe, in ancient coins, the croſs generally took the place of the head in ours: but ſome will have it called pile, from the impreſſion of a ſhip built on piles, ſtruck on this ſide our ancient coins.

PILE, in heraldry, an ordinary in form of a wedge, contracting from the chief, and terminating in a point towards the bottom of the ſhield.

PILES, in medicine, the ſame with hæmorrhoids. See the article HÆMORRHOIDS.

PILGRIMAGE, a kind of religious diſcipline, which conſiſts in taking a journey to ſome holy place, in order to adore the relics of ſome deceaſed ſaint.

Pilgrimages began to be made about the middle ages of the church; but they were moſt in vogue after the end of the eleventh century, when every one was for viſiting places of devotion, not excepting kings and princes themſelves; and even biſhops made no difficulty of being abſent from their churches on the ſame account.

The places moſt viſited were Jeruſalem, Rome, Compoſtella, and Tours; but the greateſt numbers now reſort to Loretto, in order to viſit the chamber of the Bleſſed Virgin, in which ſhe was born, and brought up her ſon Jeſus, till he was twelve years of age.

This chamber, it is pretended, was carried by angels into Dalmatia, about the year 1291, and afterwards, in the ſame manner, tranſported to Lorotto, where a magnificent cathedral is built over it. In this chamber is the image of the Bleſſed Virgin, almoſt covered with pearls and diamonds; and round the ſtatue, is a kind of rainbow formed of precious ſtones of various colours. Five hundred thouſand pilgrims ſometimes reſort to this houſe in one year, in order to pay their devotions before this glorious image.

The Mahometans are commanded in the Koran, to perform a pilgrimage to Mecca; this is one of the capital points of their religion, and therefore a prodigious cavalcade of pilgrims annually go thither, in the company of thoſe who are ſent with the grand ſeignor's preſents, to the tomb of Mahomet.

PILL, in pharmacy, a form of medicine reſembling a little ball, to be ſwallowed whole, invented in favour of ſuch as cannot take bitter and ill-taſted medicinal draughts, as alſo to keep in readineſs for occaſional uſe without decaying.

PILLAGE, among builders, is a ſquare pillar, ſtanding behind a column, to bear up arches.

PILLAR, in architecture, a kind of irregular column, round and inſulated, but deviating from the proportions of a juſt column.

Pillars are always either too maſſive, or too ſlender for regular architecture; ſuch are the pillars that ſupport Gothic vaults, or buildings; and, indeed, they are not reſtrained by any rules, their parts and proportions being arbitrary.

Butting-PILLAR, the ſame with a buttreſs. See the article BUTTRESS.

Square-PILLAR, a maſſive work, called alſo a pier, or piedroit, ſerving to ſupport arches, &c.

PILLAR, in the manege, is the center of the ring or manege-ground, round which a horſe turns, whether there be a pillar in it or not.

Beſides this, there are pillars in the circumference, or ſides of the manege-ground, placed at certain diſtances, by two and two; whence they are called the two pillars, to diſtinguiſh them from that of the center.

PILLORY, was anciently a poſt erected in a croſs-road, by the lord of the manor, with his arms upon it, as a mark of his ſeigniory, and ſometimes with a collar to fix criminals to.

At preſent it is a wooden machine, made to confine the head and hands, in order to expoſe criminals to public view, and to render them publicly infamous.

According to Sir Henry Spelman, it was at firſt peculiarly intended for the puniſhment of bakers, who ſhould be found faulty in the weight or fineneſs of their bread. At preſent, the perſons thus puniſhed, are foreſtallers, thoſe uſing falſe weights, perſons guilty of perjury, &c.

PILOT, a perſon employed to conduct ſhips over bars and ſands, or through intricate channels, into a road or harbour.

PILULARIA, in botany, a genus of ferns, the male fructifications of which grow in lines, like powder, under the leaf, and the female, towards the root, conſiſting of round polyſpermous cells.

PIMENTA, or *Pimento*, the all-ſpice tree, in botany; it grows naturally in Jamaica, to the height of thirty or more feet; the trunk is ſtrait, covered with a ſmooth brown bark, and divides upwards into many branches, which come out oppoſite, and are furniſhed with oblong leaves, like thoſe of the bay tree, both in form, colour, and texture, and placed oppoſite; theſe when bruiſed or broken emit a fine aromatic odour; the flowers are produced in large looſe bunches from the ſide of the branches toward their ends; the flowers are ſmall, and of an herbaceous colour, and are male or female on diſtinct plants. The male flowers have very ſmall petals, and a great number of ſtamina in each. The female flowers have an oval germen, ſupporting a ſlender ſtyle, crowned with a blunt ſtigma; the germen afterward becomes a globular, pulpy berry, with two cells each, containing a kidney-ſhaped ſeed. The unripe fruit of this tree makes a conſiderable branch of commerce, being the all-ſpice, ſo well known in Europe. They are gathered a little before they arrive to their full ſize, and are ſeparated from the leaves, ſtalks, or any thing which might accidentally be mixed with them, and expoſed every day to the ſun, ſpread on cloths, for a fortnight, to dry, frequently ſhaking and turning them, but are removed under cover every evening, to ſcreen them from the dews, and when thus dried, are packed up and exported.

Pimenta abounds with a fragrant eſſential oil, which is ſeparated, in great quantity, in diſtillation, and is ſo heavy that it ſinks in water.

This ſpice is much uſed in our foods, and ſometimes in medicine: it is, indeed, a very good aromatic, and ſo well imitates the mixed flavour of all the reſt, that it has long been a common practice to make the aqua marabilis, which was ordered to be diſtilled from all the ſpices, of this ingredient alone; and the taſte of the water thus made, when carefully done, is ſo near the genuine, that a very nice palate can only diſtinguiſh it.

The preſent college-diſpenſatory orders a ſimple water to be diſtilled from it, a gallon from half a pound of that ſpice, which is a better carminative than any of the former waters retained under that name.

PIMPERNEL, *Anagallis*, in botany. See the article ANAGALLIS.

PIMPINELLA, burnet-ſaxifrage, in botany, a genus of umbelliferous plants, the principal umbel is formed of many rays; the proper flowers contain five

five heartſhaped, inflexed petals, which are almoſt equal, it hath no pericarpium, but the fruit is ovate, oblong, and divided into two parts, containing two oblong furrowed ſeeds, convex on one ſide, and flat on the other. The common ſort, which grows wild in many parts of England, is ſaid to be detergent, vulnerary, and diuretic. This genus comprehends the tragoſelinum of Tournefort.

PIMPLE, in ſurgery, a ſmall puſtule, ariſing chiefly on the face. See the article PUSTULE.

PIN, in commerce, a little neceſſary implement, made of braſs wire, uſed chiefly by the women in adjuſting their dreſs.

PINASTER, in botany, a ſpecies of the pine tree. See PINE.

PINDARIC, in poetry, an ode formed in imitation of the manner of Pindar.

The Pindaric manner is diſtinguiſhed by the boldneſs and height of the flights, the ſuddenneſs and ſurpriſingneſs of the tranſitions, and the ſeeming irregularity, wildneſs, and enthuſiaſm of the whole.

The only part remaining of Pindar's works, is a Book of Odes, all in praiſe of the victors at the Olympian, Pythian, Nemæan, and Iſthmian, games: whence the firſt is intitled the Olympians; the ſecond, the Pythians; the third, the Nemæans; and the fourth, the Iſthmians.

PINE, *Pinus*, in botany, a genus of ever-green trees, the leaves of which come out of ſmall ſheaths, in pairs in ſome ſpecies, and in others by threes or fives; they are of a bluiſh-green colour, and placed, for the moſt part, on every ſide of the branches; the flowers are male and female, growing on the ſame tree, and are both deſtitute of a corolla; the male flowers are collected in a bunch, and contain many ſtamina connected in a column at their baſe, but dividing at the top: the female flowers are collected in a common, almoſt oval, cone, and ſtand at a diſtance from the male on the ſame tree, the ſcales of which are biflorous, oblong, imbricated, and perſiſtent, under which a ſmall germen is placed, ſupporting a ſubulated ſtyle, crowned with a ſingle ſtigma, which becomes an oblong oval nut, crowned with a membranaceous wing, and included in the rigid ſcale of the cone.

There are ſeveral ſpecies of pine trees, which are raiſed for ſale in the nurſeries, but the moſt valuable are, what is commonly called the Scotch fir, and a North American ſpecies, known among the gardeners here, by the name of lord Weymouth's pine, the former of which grows naturally on the mountains of Scotland, alſo in Denmark, Norway, and Sweden, the leaves of which grow out of a ſheath in pairs, which are twiſted, and are of a greyiſh colour: it will grow on almoſt any ſoil, and the timber of it is the moſt durable of any kind of pines yet known, the beſt yellow deals being the wood of this tree.

The lord Weymouth's pine grows naturally in moſt parts of North America; it is one of the talleſt trees of all the ſpecies, often growing to a hundred feet high in thoſe countries; the bark is very ſmooth, the leaves are long and ſlender, five growing out of each ſheath, the branches are pretty cloſely furniſhed with them, ſo makes a fine appearance; the cones are long, ſlender, and very looſe, opening with the firſt warmth of the ſpring, ſo that if they are not gathered in the winter, the ſeeds will be ſhed: the wood of this ſort is much eſteemed for making maſts for ſhips, &c. This ſort, and the Scotch pine, are the beſt worth cultivating of all the kinds, for the ſake of their valuable timber. All the ſorts of pine trees are raiſed from the ſeeds taken out of their polyſpermous cones: the way to get them out is, by expoſing the cones to a gentle fire, which will cauſe the cells to open, and then the ſeeds may be eaſily taken out, but this ſhould not be done until the ſeaſon is arrived for ſowing, which is about the middle of March, and when the ſeeds are ſown, they ſhould be protected by nets from the birds, otherwiſe they will be in danger of being deſtroyed when they firſt come up, for as they bring up the huſks on the top of the plants, the birds will pick off the heads of the plants, whereby they are deſtroyed, unleſs carefully guarded againſt. If the quantity of ſeeds to be ſown is few, they may be raiſed in pots or boxes, but if large, ſo as to require a good ſpace to receive them, then they may be ſown on an eaſt or north-eaſt border, where they may be ſcreened from the ſun, and thoſe which are ſown in pots or boxes, ſhould be placed in a ſhady ſituation, here they may remain till the ſpring following, when they ſhould be tranſplanted into the nurſery, at the diſtance of ſix or eight inches aſunder, where they may remain two years, and afterward tranſplanted, where they are to continue for good.

The Scotch pine being the hardieſt of all the kinds, and the wood of it the moſt uſeful (as was before obſerved) is the ſort which beſt deſerves our notice; this will thrive upon the moſt barren ſands, where ſcarce any other plants will grow, except heath and furze; and as there are many thouſand acres of ſuch land, lying convenient for water-carriage, in this kingdom (and is at preſent of little uſe to any one) it might be ſo improved by plantations of theſe trees, as to become good eſtates to the proprietors of ſuch lands, and alſo a national benefit; and, as the legiſlature has taken this into conſideration, and have already paſſed ſome laws for the encouragement of theſe plantations, and alſo for their preſervation and ſecurity; ſo it may be hoped, that this will be undertaken by the gentlemen who are poſſeſſed of ſuch lands, in all the different parts of this kingdom, with proper ſpirit; for although they may not expect to receive much profit from theſe plantations in their own time, yet their ſucceſſors may,

may, with large intereſt: and the pleaſure which theſe growing trees will afford them, by beautifying the preſent dreary parts of the country, will, in ſome meaſure, recompence them for their trouble and expence.

To this genus Linnæus has added the fir and larch trees; which ſee. From the wild pine or pineaſter is procured the common turpentine; and the kernels of the nuts of the manured or ſtone-pine are of a balſamic nouriſhing nature, and good for conſumptions, coughs, and hoarſneſs; they are reſtorative, and of ſervice after long illneſs.

PINE-APPLE, *Ananas*, in botany. See the article ANANAS.

Ground-PINE, in botany. See the article CHAMÆPITYS.

PINEAL GLAND, in anatomy, a gland in the third ventricle of the brain; thus called from its reſemblance to a pine-apple.

It is of a greyiſh colour, and its proceſſus and baſe are often medullary: this gland has often by many been ſuppoſed the peculiar ſeat of the ſoul.

PINGUICULA, butter-wort, in botany, a genus of plants, whoſe flower is monopetalous and ringent, the longer lip of which is ſtraight, obtuſe, trifid and ſupine; the ſhorter lip is bifid, more obtuſe, and ſpreading: it hath a corniculated nectarium, produced from the baſe of the petal: the ſtamina are two cylindric curved filaments, topped with roundiſh antheræ; and the fruit is an ovate capſule, compreſſed at the top, having one cell, which contains many cylindraceous ſeeds, with a looſe receptacle.

This genus grows wild in boggy lands in divers parts of England.

PINION, in mechanics, an arbor, or ſpindle, in the body whereof are ſeveral notches, that catch the teeth of a wheel that ſerves to turn it round: or it is a leſſer wheel which plays in the teeth of a larger.

In a watch, &c. the notches of a pinion, which are commonly 4, 5, 6, 8, &c. are called leaves, and not teeth, as in other wheels.

PINK, in botany, the Engliſh name for ſeveral beautiful ſpecies of dianthus, much cultivated in our gardens; the principal of which are, the pheaſant's-eye pink, with double and ſingle flowers; the common red pink, the cob pink, Dobſon's pink, white cob pink, the painted-lady pink, the China pink, &c. They are all propagated by ſlips, layers, or from ſeed.

The beſt time for planting the ſlips of pinks is in July or Auguſt, taking the opportunity of moiſt weather: the China or Indian pink is propagated from ſeeds, which ſhould be ſown upon a gentle hot bed about the beginning of April, and in about three weeks or a month the plants will be up, and ſtout enough to remove; they ſhould then be taken up, with a ball of earth to their roots, and planted in a bed of rich mould, at about three inches aſunder, and in dry weather muſt be frequently watered; the farther care is to keep them from being over-run with weeds, till June, at which time they may be tranſplanted to the place where they are deſigned to remain for flowering. If they are taken up with large balls to their roots (as before directed) they will not be injured by their removal; and as they grow not very large, it is beſt to plant them in beds, at about eight inches aſunder, where they will make a more beautiful appearance than intermixed with other flowers, there being a fine contraſt among theſe flowers, as ſcarce any two are marked alike; for no ſort of plant produces ſuch varieties of rich-coloured flowers as theſe do, which annually vary when raiſed from ſeeds.

As all the different kinds of pinks are either ſpecies or varieties of the dianthus (which comprehends the carnations and ſweetwilliams alſo) we muſt therefore refer the reader to the article CARNATION for the generical characters of theſe plants.

PINNACLE, in architecture, the top or roof of a houſe, terminating in a point.

This kind of roof, among the ancients, was appropriated to temples; their ordinary roofs were all flat, or made in the platform way. It was from the pinnacle that the form of the pediment took its riſe.

PINNATED LEAVES, *Pinnata Folia*, in botany, thoſe which are compoſed of ſeveral folioles, or partial leaves, connected to the ſides of a petiole, in the form of wings.

Of pinnated leaves there are ſeveral kinds, as 1. the pinnated with an odd one, that is, when it is terminated with an odd foliole; 2. the cirrhoſe-pinnated leaf, when it is terminated with a tendril or claſper; 3. an abrupt-pinnated leaf, when it is terminated neither by a foliole or cirrhus; 4. the oppoſitely-pinnated, is when the folioles, or lobes, ſtand oppoſite on the mid-rib or petiole; 5. the alternately-pinnated, when the folioles are produced alternately; 6. the interruptedly-pinnated, when the folioles are alternately leſs; 7. the articulately-pinnated, when the petiole, common to all the folioles, is jointed; 8. the decurſively-pinnated, when the folioles run along the petiole from one to another; 9. the conjugate-pinnated, when the leaf conſiſts but of two folioles only on the petiole; 10. Bepinnate on duplicato-pinnated, when the foot-ſtalk is divided, and each diviſion ſuſtains ſeveral folioles ranged on their ſides like wings; 11. triplicato pinnate, expreſſes a leaf, the petioles of which ſend out three alated diviſions, before it has any folioles on it; theſe laſt are terminated ſometimes by two folioles each, and in that caſe are ſaid to be abrupt; ſometimes by an odd foliole, and are then called triplicato-pinnata cum impari.

PINNING, in building, the faſtening of tiles together, with pins of heart of oak, for the covering of a houſe, &c.

PINT, a veſſel, or meaſure, uſed in eſtimating

the quantity of liquids, and even ſometimes of dry things. See the article MEASURE.

PINTLE, among gunners, an iron, which ſerves to keep the guns from recoiling.

PINUS, the pine-tree, in botany. See the article PINE.

PIONEER, in the art of war, a labourer employed in an army to ſmooth the roads, paſs the artillery along, and dig lines and trenches, mines, and other works.

PIONY, in botany. See the article PÆONY.

PIP, or PEP, *Pepia*, a diſeaſe among poultry, conſiſting of a white thin ſkin, or film, that grows under the tip of the tongue, and hinders their feeding. It uſually ariſes from want of water, or eating filthy meat. It is cured by pulling off the film with the fingers, and rubbing the tongue with ſalt. Hawks are particularly liable to this diſeaſe, eſpecially from feeding on ſtinking fleſh.

PIPE, in building, &c. a canal, or conduit, for the conveyance of water and other liquids. Pipes for water, water-engines, &c. are uſually of lead, iron, earth, or wood: the latter are uſually made of oak or elder. Thoſe of iron are caſt in forges, their uſual length is about two feet and a half; ſeveral of theſe are commonly faſtened together by means of four ſcrews at each end, with leather or old hat between them, to ſtop the water. Thoſe of earth are made by the potters; theſe are fitted into one another, one end being always made wider than the other. To join them the cloſer, and prevent their breaking, they are covered with tow and pitch: their length is uſually about that of the iron-pipes. The wooden pipes are trees boared with large iron augres, of different ſizes, beginning with a leſs, and then proceeding with a larger ſucceſſively; the firſt being pointed, the reſt being formed like ſpoons, increaſing in diameter, from one to ſix inches or more.

PIPE alſo denotes a veſſel or meaſure for wine, and things meaſured by wine-meaſure. See the article MEASURE.

PIPE, in mining, is where the ore runs forwards end-ways in a hole, and doth not ſink downwards, or in a vein.

PIPE-TREE, in botany, a name given ſometimes to the ſyringa or philadelphus. See the article PHILADELPHUS.

PIPER, pepper, in botany. See PEPPER.

PIPPS, among floriſts, are the diſtinct flowers of ſuch plants which grow in truſſes or bunches, and is particulurly applied to auriculas and polyanthuſes.

PIQUETTES, among floriſts, a kind of carnations; they have always a white ground, and ſpotted or pounced with red, ſcarlet, purple, or other colours. See the article CARNATION.

PIRATE, PYRATE, or ROVER, *Pirata*, a perſon, or veſſel, that robs on the high ſeas, without permiſſion or authority of any prince or ſtate.

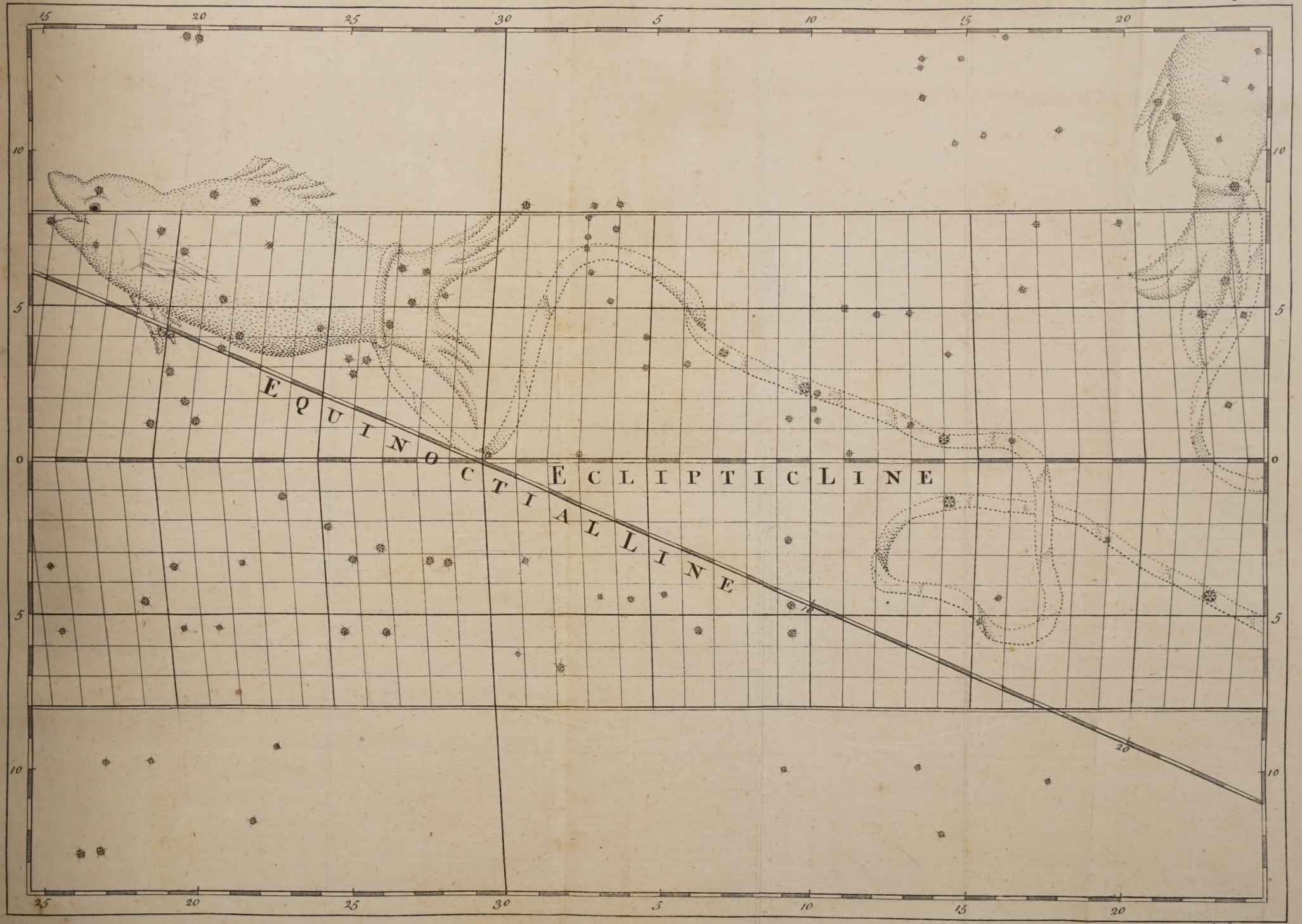
When a pirate enters into any port or haven, and there robs a merchant's ſhip, this is not held to be piracy, becauſe it is not done on the high ſea, but it is a robbery at common law. In caſe a ſhip is riding at anchor on the ſea, and it happens that the mariners or ſeamen are part in their boat, and the reſt on ſhore, by which accident none are left in the ſhip; here, if a pirate ſhall attack her, and commit a robbery, the ſame is piracy. Nevertheleſs, the taking, by a ſhip at ſea, in great neceſſity of victuals, cables, ropes, &c. ſuch things out of another veſſel, is not ſo, where that other veſſel can ſpare ſuch things, and the takers pay or give ſecurity for them. The manner of trying a pirate, is by a ſpecial commiſſion, directed to the lord high admiral, &c. and the offence of piracy may be heard and determined, as if the robbery was committed on land; and offenders ſhall ſuffer the like pains of death, loſs of lands and goods, &c. Perſons combining to yield up ſhips to pirates, or to lay violent hands on the commanders of ſhips, or that correſpond with any pirate, are adjudged guilty of piracy. All the proper goods of pirates are granted to the lord high admiral by patent; but not their piratical goods, which, where the owner is not known, belong to the king.

PISCES, in aſtronomy, the twelfth ſign or conſtellation of the zodiac.

The ſtars in piſces, in Ptolemy's catalogue, are 38; in Tycho's, 33; in the Britannic catalogue 109. The longitudes, latitudes, magnitudes, &c. are as follow. See plate LXXIV.

Names and Situations of the Stars.	Signs.	Longitude. ° ′ ″	Latitude. ° ′ ″		Magn.
	♓	11.56.33	7.22.49	B	7
		12.56.36	6.51.40	B	6
		12.55. 9	6. 1. 9	B	6
In the mouth of the ſouth. fiſh ——	——	15. 6.17	9. 3.19	B	4
		15.31.39	7. 1.31	B	6
5.					
South. of the 2 in the hind part of the head	——	17.54. 5	7.16.43	B	4
North. in the hind-part of the head ——	——	19.32.38	8.52.36	B	5 6
Preced. of 2 in the belly —— ——	——	19.24.54	4.26.26	B	5

PISCES.



J. Lodge sculp.

Names and Situations of the Stars.	Signs.	Longitude. ° ′ ″	Latitude. ° ′ ″		Magn.
A ſmall one contig. to it	♓	19.25.41	4.16.40	B	6 7
Preced. in the back		21.42.48	9. 1.58	B	5
10.					
		18.46. 8	1.22.54	B	6
		19. 6.26	2. 4.20	B	6
		19.38.49	1.46.36	B	6
		20. 4.19	1.24.53	B	6
		21.25. 4	3.37.54	B	6
15.					
		21.56. 7	4.15.34	B	6
Subſeq. in the back		24. 8.59	7.12.12	B	5
Subſeq. of two in the belly		23. 6.57	3.25. 7	B	5
		26.50.32	11. 7.22	B	7
		24.41.16	4.32.43	B	5 6
20.					
Firſt of thoſe preced. the ſquare under the ſouth. fiſh		22.38.42	1.19.43	A	6 7
		24.31.28	2. 1.47	B	6
		25.50. 5	3.28.57	B	6
Second		23.38. 5	2.11.39	A	6 7
		28.13.11	6.58.13	B	6
25.					
Preced. of north. in the ſquare		24.47.55	3. 7.49	A	5
In the tail of the ſouth. fiſh		29. 5.16	6.22.15	B	5
Sub. of the north. in the ſquare		25.43.25	2.57.45	A	5
Preced. of the north. in the ſquare		24.32.57	5.42.33	A	5
	♈	39.33	7.57.50	B	6
30.					
That which follows over the tail		29. 6	7.31.43	B	5 6
Subſeq. the ſouth. of thoſe in the ſquare under Piſces	♓	25.26.59	5.46.55	A	5 4
	♈	3.16.44	9.12.37	B	6
		3.27.37	6.36. 3	B	9
		3.35.29	5.54.26	B	6
35.					
		5.54.27	11. 5.36	B	6
		4. 1.59	6.24. 2	B	7
		7. 9. 6	13.12. 4	B	6
		7.36.39	12.55. 3	B	6
In the line next the tail of Piſces		4.29.37	5.27.36	B	6
40.					
		6.59. 9	10. 9. 8	B	6
		7.51.34	10.41.48	B	6
		3. 6.31	44.39	A	6
		5.27.16	4.30.42	B	6
		10.48. 1	15. 6.45	B	6
45.					
		10. 7. 4	13.37.31	B	6
		9.33.52	12.16.56	B	7
		9.59. 8	11.39.13	B	7
Second from the tail in the line		6.40. 3	3.10.38	B	6
		12. 9.17	15.23.53	B	6
50.					
		10.59. 8	10.21.41	B	7
		14.16. 1	15.43.24	B	7
		13.17. 3	9.38.42	B	6
		11.59.10	5.22.25	B	7
		15. 6.57	13.19.58	B	7
55.					

PIS

Names and Situations of the Stars.	Signs.	Longitude.	Latitude.		Magn.
	♓	° ′ ″	° ′ ″		
Preced. of the bright ſtars in the line		10. 2.43	1.31.48	B	7
		15.47.59	14.30.43	B	7
		10.27.52	1.57.28	B	7
		10.39.38	2. 9.44	B	4
		14.24 23	10.44.49	B	6
60.					
Preced. of 3 in the head of the north fiſh		19. 8. 8	20.30.33	B	6
		66.32.50	12.17.13	B	6
Middle of thoſe in the head		20.13.43	19.29.38	B	6
Laſt of 3 in the head of the north. fiſh		21.24.14	20.57. 8	B	6
Preced. of 2 againſt the eye of the north. fiſh.		23.44. 2	23. 3 47	B	5
65.					
Middle of the bright ſtars in the ſouth line		14. 2.32	1. 4. 7	B	4
		17.13.57	7.23.22	B	6
		13.36.30	1.10.40	A	6
Preced. of 2 in the fin of the back		19.56.21	13.21. 8	B	5
		16.33.42	5.31.13	B	6
70.					
Subſ. againſt the eye of the north. fiſh		24.36.51	23. 6.23	B	5
		13.32. 9	1.55.32	A	6
		24.54.39	22.47.51	B	6
Middle in the fin of the back		20. 8.46	12.28.46	B	6
		12.56.58	4 49. 8	A	7
75.					
Upper in the fold of ſouth. line		14.27.33	1.30.24	A	5
Laſt of 3 in the fin of the tail		20. 8. 8	11.18. 9	B	6
North. of 2 againſt the mouth of the north. fiſh		25.17.53	21.59. 6	B	6
South. of the ſame		24.48.47	20.42.19	B	5
		13.42.48	4.40.45	A	7
80.					
That follow the fin of the back		21. 2. 4	12.25.29	B	5
		14.11.37	4.50.30	A	7
South. of 2 in the belly		22.58.52	15.29. 2	B	5
Laſt of 3 bright ones in the ſouth. line		16.22.34	13 25	A	4
		19.43.36	7.39.27	B	7
85.					
		16.23.14	51.50	A	6 7
South. of 2 in the fold of the ſouth. line		15.50.25	4.17.13	A	6
North. in the belly		25.17.31	17.26.56	B	5
Another following it		26.15.42	18.39.53	B	6
		22.30.17	8.20.43	B	7
90.					
Preced. of the contig. in the bending of the line		23.35.33	9.22. 3	B	5
Subſ. of the ſame		23.42.48	9.23.58	B	5
		18.46.21	3.34.52	A	7
		19.47. 6	1.57.39	A	6 7
		24. 4.44	8.17.49	B	6 7
95.					
Third of thoſe in north. line before the knot		19.37. 1	3. 4.25	A	5
North. of 3 in north. line		23.20.41	5.21. 7	B	4 3
		24. 1.56	4.20.47	B	6
Middle of thoſe in the north line		23.25.39	1.52. 5	B	5 4
		25.32	5.51.46	B	8
100.					
		24.40.27	3.40.32	B	7
		25.33.16	5.38. 7	B	6 7

Names and Situations of the Stars.	Signs.	Longitude. ° ′ ″	Latitude. ° ′ ″		Mag.
Second of thoſe in ſouth. line before the knot ——	♈	22. 58	4.43.12	A	5
		27.38. 3	9. 1.34	B	6 7
		28. 4.48	8.36.20	B	8
105.					
The next the knot in the north. line —— ——		24.15. 1	1.38.58	A	5
Firſt before the knot in the ſouth. line —— ——		24. 1.39	7.55.45	A	5
		25.32.26	8.35. 5	A	6 7
In the knot of the two lines —— —— ——	♈	26.52.56	9. 5.10	A	3

PISCIDIA, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is emarginated and riſing upwards; the alæ are of the ſame length as the vexillum; and the carina is moon-ſhaped and aſcendant: the fruit is a membranaceous linear pod, having four longitudinal angles, and containing a few almoſt cylindrical ſeeds.

PISCINA, in antiquity, a large baſon in a public place or ſquare, where the Roman youth learned to ſwim, and which was ſurrounded with a high wall, to prevent caſting of filth into it.

PISCIS Volans, in aſtronomy, a ſmall conſtellation of the ſouthern hemiſphere, unknown to the ancients, and inviſible to us in theſe northern regions.

PISONIA, in botany, a genus, producing male and female flowers on different plants; the flower of the male is funnel-ſhaped, the tube ſhort, and the limb is cut into five acute ſegments, and ſpreads open; the filaments are five or ſix, and awl-ſhaped, terminated by obtuſe antheræ; the female flowers are of the ſame form, and the fruit is an oval quinquangular capſule, or berry, having but one cell, which contains a ſmooth oblong ſeed.

PISSASPHALTUM, earth pitch, in natural hiſtory, a fluid, opake, mineral body, of a thick conſiſtence, of a ſtrong ſmell, readily inflammable, but leaving a reſiduum of greyiſh aſhes after burning.

It ariſes out of the cracks of rocks, in ſeveral places in the iſland of Sumatra, and in ſome other parts of the Eaſt-Indies, and is much eſteemed there in paralytic diſorders. It is greatly recommended by the ancients as an emollient, maturant, and digeſtive; and was uſed in cataplaſms for ripening all ſorts of tumours, and againſt the ſciatica, and other pains of the limbs.

PISSELÆUM Indicum, Barbadoes-tar, in natural hiſtory, a mineral fluid, of the nature of the thicker bitumens, and of all others the moſt approaching, in appearance, colour, and conſiſtence, to the true piſſaſphaltum, though differing from it in other reſpects.

It is very frequent in many parts of America, where it is found trickling down the ſides of mountains in large quantities, and ſometimes floating on the ſurface of the waters: but it ſeems to be almoſt loſt at this time in the iſland of Barbadoes, whence it was originally named.

It has been greatly recommended internally in coughs and other diſorders of the breaſt and lungs; but it is ſeldom to be met with genuine.

PISTACIA, in botany, a genus, producing male and female flowers on ſeparate trees; the male flowers are diſpoſed in a looſe ſcattered amentum, having ſmall uniflorous ſcales; there is no corolla, but the perianthium, which is ſmall and quinquifid, contains five ſmall filaments, topped with ovate, four-cornered, large, erect antheræ; the female flower has a ſmall trifid cup, with no corolla; the germen is ovate, larger than the cup, ſupporting three reflexed ſtyles, crowned with thick prickly ſtigmas: the fruit is a dry ovate drupe, containing a ſmooth nut of the ſame ſhape.

Piſtachia-nuts are brought from Perſia, Arabia, Syria, and the Eaſt-Indies; in theſe countries, the trees which produce them, grow to the height of twenty-five or thirty feet; the bark of the ſtem and old branches are of a dark ruſſet colour, but the young branches are of a light brown; theſe are furniſhed with pinnated leaves, compoſed ſometimes, and at others, three pair of folioles, terminated by an odd one; they approach toward an oval ſhape, and their edges turn backwards, which emit an odour like the nuts.

Theſe nuts abound with a ſweet and well-taſted oil, which they will yield in great abundance, on being preſſed after bruiſing them: they are reckoned wholeſome and nutritive, and are very proper to be preſcribed by way of reſtoratives, eaten in a moderate quantity, and to people emaciated with long illneſſes. They are recommended as peculiarly good to prevent obſtructions of the liver.

PISTIA, in botany, a genus of gynandrious plants, whoſe flower is monopetalous, lubuloſe, and unequal; the limb is ear-ſhaped, erect, and acuminated: the fruit is an ovate unilocular capſule, containing many oblong ſeeds, affixed to the back of the capſule.

PISTIL, *Piſtillum*, among botaniſts, denotes the female organ of generation in flowers, and is defined, by Linnæus, as an entrail of the plant, de-

ſigned

ſigned for the reception of the farina, or male-duſt, wherewith it becomes impregnated; it conſiſts of three parts, viz. the germen, ſtyle, and ſtigma; the germen is the rudiment of the fruit, accompanying the flower, and is of various ſhapes, but always ſituated below the ſtyle, or ſtigma, and contains the embryo-ſeeds; the ſtyle is the part that ſerves to elevate the ſtigma from the germen, and is alſo of different forms; the ſtygma, which is of various ſhapes likewiſe, is always placed on the top of the ſtyle, or, if that be wanting, on the top of the germen; this part is covered with a moiſture, for the breaking of the farina into more minute parts.

The piſtil, being the female part of a flower, is of great conſequence in the Linnæan Syſtem of Botany. See the article BOTANY.

PISTOL, the ſmalleſt piece of fire-arms, borne at the ſaddle-bow, on the girdle, and in the pocket.

PISTOLE, a gold coin ſtruck in Spain, and in ſeveral parts of Italy, Switzerland, &c.

The piſtole has its augmentations and diminutions, which are, quadruple-piſtoles, double-piſtoles, and half-piſtoles.

PISTON, *Embolus*, in pump-work, is a ſhort cylinder of metal, or other ſolid ſubſtance, fitted exactly to the cavity of the barrel or body of the pump.

PISUM, the pea, in botany. See the article PEA.

PITCH, a tenacious oily ſubſtance, drawn chiefly from pines and firs, and uſed in ſhipping, medicine, and various other arts: or it is more properly tar, inſpiſſated by boiling it over a ſlow fire.

PITH, in vegetation, the ſoft ſpungy ſubſtance contained in the central parts of plants and trees.

As the ſubſtance of the trunk in trees, ſays Boerhaave, become more woody, the pith is compreſſed and ſtraigthened to ſuch a degree, that it wholly diſappears. It is plain from this, that the office of the pith in vegetation, cannot be very great, ſince it is not of perpetual duration. By its ſpungy ſtructure, it ſeems fitted to receive any ſuperfluous moiſture, that might tranſude through the pores of the woody fibres. If by the exceſs of ſuch moiſture, or from any other cauſe, it happens to rot and periſh, as frequently happens in elms, the tree is found to grow full as well without it; a proof it is of no eſſential uſe in vegetation.

PITUITARY GLAND, in anatomy, a gland in the brain, of the ſize of a very large pea, placed under the cella of the os ſphenoides, under the infundibulum, wherewith it communicates, receiving from it a lymph or a juice, which the infundibulum derives from the plexus choroides and pineal gland; and from this lympha does the gland itſelf take its name. It alſo filtrates a juice itſelf, ſeparating from the blood a white liquor, very ſubtile, and apparently very ſpirituous.

PIVAT, or PIVOT, a foot or ſhoe of iron, or other metal, uſually conical, or terminating in a point, whereby a body, intended to turn round, bears on another fixed at reſt, and performs its circumvolutions. The pivot uſually bears or turns round in a ſole, or piece of iron or braſs, hollowed to receive it.

PLACARD, or PLACART, among foreigners, ſignifies a leaf or ſheet of paper, ſtretched out and applied on a wall or poſt, containing edicts, regulations, &c.

Among us, placard ſignifies a licence, whereby a perſon is permitted to uſe unlawful games, &c.

PLACARD, in architecture, denotes the decoration of the door of an apartment, conſiſting of a chambranle, crowned with its frieze or gorge, and a corniche, ſometimes ſupported by conſoles. See the article DOOR.

PLACE, *Locus*, in philoſophy, a mode of ſpace, or that part of immoveable ſpace which any body poſſeſſes. See the article SPACE.

Optical PLACE, the point to which the eye refers an object.

PLACE *of Radiation*, is the ſpace in a medium or tranſparent body, through which any viſible object radiates.

Excentric PLACE *of a Planet*. See the article EXCENTRIC.

Geocentric PLACE *of a Planet*. See the article GEOCENTRIC.

Heliocentric PLACE *of a Planet*. See the article HELIOCENTRIC.

PLACE, in geometry. See the article LOCUS.

PLACE, in war, a general name for all kinds of fortreſſes where a party may defend themſelves.

PLACE, in logic and oratory, denotes the ſeat or ſource of an argument, of which there are two kinds, inartificial and artificial; the firſt is the place of teſtimony, authority, &c. the ſecond, that of reaſon, as when we argue from univerſals, cauſes, &c.

Common PLACE. See the article COMMON PLACE.

PLACENTA, in anatomy, a ſoft roundiſh maſs, found in the womb of pregnant women; which, from its reſemblance to the liver, was called by the ancients, hepar uterinum, the uterine liver.

PLACENTA, is alſo a term uſed, by ſome botaniſts, for what is more uſually called the receptacle of the ſeeds. See the article RECEPTACLE.

PLAFOND, or PLAFOUND, in architecture, the ceiling of a room, whether it be flat or arched, lined with plaſter or joiner's work, and frequently enriched with painting.

The word plafond is alſo more particularly uſed for the bottom of the projecture of the larmier of the corniche, called alſo ſoffit. See the article SOFFIT.

PLAGIARY, in philology, the purloining another perſon's works, and putting them off for a man's own.

PLAGUE,

PLAGUE, PESTILENCE, or PESTILENTIAL-FEVER, a moſt acute fever, ariſing from a poiſonous miaſma, brought from oriental countries, which, unleſs it is immediately expelled out of the body, by the ſtrength of the vital motions, by buboes and carbuncles, proves fatal.

In this, as well as in moſt contagious diſeaſes, ſays Hoffman, the venomous miaſma is ſwallowed with the air, and inſinuates itſelf into the ſalival juice; whence it aſſaults the head, brain, nerves, and animal ſpirits; producing a torpor in the head, a heavineſs, a ſleepineſs, a violent pain, a ſtupor of the ſenſes, a forgetfulneſs, inquietude, watching, and loſs of ſtrength. From the fauces it proceeds to the ſtomach, creating a loathing of food, nauſeas, anxiety of the precordia, a cardialgia attended with fainting, reaching to vomit, and vomiting itſelf. Hence it proceeds to the membranes of the ſpinal marrow, the coats of the arteries, producing horrors, a languid, ſmall, contracted, quick pulſe, and even fainting. All which are generally ſigns and ſymptoms of the plague, which are of a more violent and quick operation in proportion to the virulence of the peſtilential miaſma.

This diſeaſe differs from other contagious, malignant, and eruptive fevers, becauſe it is the moſt acute, and ſometimes kills on the firſt, and ſometimes on the ſecond day. In our climate, it is not epidemic or ſporadic, from a bad way of living or an unhealthy air, but happens when it is moſt ſalutary, from contagion alone, and is imported from hot countries where this diſeaſe rages. It will not only abate by intenſe cold, but be perfectly extinguiſhed: wherefore, in a cold ſeaſon and very cold countries, it either does not appear at all, or in a very mild degree; whereas if the climate is hot, it is not only moſt violent, but moſt common.

All plagues are not of the ſame nature, but vary according to different conſtitutions and circumſtances; but all who have written of the plague univerſally agree, that ſpongy and porous bodies, of an obeſe habit, of a ſanguine and phlegmatico-ſanguine conſtitutions, women, young perſons and children, perſons of a timid diſpoſition, that are poor, live hard, or are given to luxury, and ſit up late at night, are more apt to be afflicted with this diſeaſe than the ſtrong and intrepid, lean, nervous, endued with large veſſels, men, old perſons obnoxious to the hæmorrhoidal flux, and who have iſſues and open ulcers.

Nothing brings on this diſtemper ſooner than fear, a dread of death, and a conſternation of the mind. If the peſtilential poiſon is not expelled to the external parts, it is certainly fatal; nor is this to be done, according to Hoffman, as in other fevers, by large ſweats, by ſtools, by a flux of urine, by bleeding at the noſe, either natural or artificial: for theſe threaten deſtruction. The ſalutary and critical excretion which perfectly ſolves the peſtilential diſeaſe, is by tumours in the ſurface of the body, not otherwiſe than the eryſipelas, between the third and fourth day, and the ſooner the better, becauſe then the ſymptoms are mitigated. That there is poiſon contained in theſe tumours appears from hence, that if the ſurgeon opens any of the tumours with his lancet, and then bleeds a ſound man with the ſame, he will be immediately ſeized with the plague. The peſtilental tumours are of two kinds, the firſt ariſes in the glandulous places, moſt commonly in the groin and arm-pits; ſometimes in the parotid and mammary glands, as alſo the lower maxillary, and in thoſe near the aſpera arteria.

PLAGUE-WATER, *Aqua Epidemica*, one of the compound waters of the ſhops, diſtilled from mint, roſemary, angelica-roots, &c.

PLAIN, *Planus*, in general, an appellation given to whatever is ſmooth and even, or ſimple, obvious, and eaſy to be underſtood; and, conſequently, ſtands oppoſed to rough, enriched, or laboured.

A plain figure, in geometry, is an uniform ſurface; from every point of whoſe perimeter, right lines may be drawn to every other point in the ſame.

A plain angle is one contained under two lines, or ſurfaces, in contradiſtinction to a ſolid angle. See ANGLE.

The doctrine of plain triangles, as thoſe included under three right lines, is termed plain trigonometry. See the article TRIGONOMETRY.

PLAIN CHART. See the article CHART.

PLAIN SAILING. See SAILING.

PLAIN SCALE. See SCALE.

PLAIN TABLE, in ſurveying, a very ſimple inſtrument, whereby the draught of a field is taken on the ſpot, without any future protraction. It is generally of an oblong rectangular figure, and ſupported by a fulcrum, ſo as to turn every way by means of a ball and ſocket. It has a moveable frame, which ſerves to hold faſt a clean paper; and the ſides of this frame, facing the paper, are divided into equal parts every way. It has alſo a box with a magnetical needle, and a large index with two ſights: and, laſtly, on the edge of the frame, are marked degrees and minutes, to ſupply the place of a graphometer.

PLAIN NUMBER, is a number that may be produced by the multiplication of two numbers into one another: thus 20 is a plain number, produced by multiplication of 5 into 4.

PLAIN PLACE, *Locus Planus*, or *Locus ad Planum*, among the antient geometricians, denoted a geometrical locus, when it was a right line or a circle, in oppoſition to a ſolid place, which was an ellipſis, parabola, or hyperbola. Theſe the moderns diſtinguiſhed into loci ad rectam, and loci ad circulum. See LOCUS.

PLAIN PROBLEM, in mathematics, is ſuch a problem as cannot be ſolved geometrically, but by the

the interſection either of a right line and a circle, or of the circumferences of two circles; as, given the greateſt ſide, and the ſum of the other two ſides of a right-angled triangle, to find the triangle; as alſo to deſcribe a trapezium that ſhall make a given area of four given lines. Such problems can only have two ſolutions, in regard a right line can only cut a circle, or one circle cut another in two points.

PLAINT, in law, the exhibiting any action, real or perſonal, in writing. See the article ACTION.

PLAN, in general, denotes the repreſentation of ſomething drawn on a plane: ſuch as maps, charts, ichnographies, &c. See MAP, CHART, &c.

The term plan, however, is particularly uſed for a draught of a building, ſuch as it appears, or is intended to appear, on the ground; ſhewing the extent, diviſion, and diſtribution of its area, or ground-plot, into apartments, rooms, paſſages, &c.

A geometrical plan is that, wherein the ſolid and vacant parts are repreſented in their natural proportions.

The raiſed plan of a building, is the ſame with what is overwiſe called an elevation, or orthography. See ORTHOGRAPHY.

A perſpective plan, is that exhibited by degradations, or diminutions, according to the rules of perſpective. See the article PERSPECTIVE.

PLANCHIER, or PLANCERE, in architecture, the under part of the corona, or drip, making the ſuperior part of the corniche, between two cymatiums. See the articles CORNICHE and CYMATIUM.

PLANE, *Planum*, in geometry, denotes a plane ſurface, or one that lies evenly between its bounding lines: and as a right line is the ſhorteſt extenſion from one point to another, ſo a plane ſurface is the ſhorteſt extenſion from one line to another.

In aſtronomy, conics, &c. the term plane, is frequently uſed for an imaginary ſurface, ſuppoſed to cut and paſs through ſolid bodies; and on this foundation is the whole doctrine of conic ſections built.

PLANE, in joinery, an edged tool, or inſtrument for paring and ſhaving of wood ſmooth.

PLANE-TREE, *Platanus*, in botany, a genus of plants, producing male and female flowers. Botaniſts enumerate two ſpecies of theſe trees, one commonly called the oriental plane, and the other the occidental plane tree; the firſt ſort grows naturally in many parts of Aſia, where it riſes to a very great ſize; the ſtem is tall, erect, and covered with a ſmooth bark, which annually falls off; it ſends forth many ſide branches, which are generally a little crooked at their joints: the bark of the young branches is of a dark brown, inclining to a purple colour; theſe are furniſhed with leaves placed alternately, their footſtalks are an inch and a half long, the leaves are ſeven inches long and eight broad, deeply cut into five ſegments, and the two outer are ſlightly cut again into two more; theſe ſegments have many acute indentures on their edges, and have each a ſtrong midrib, with many lateral veins running to the ſides; the upper ſides of the leaves are of a deep green, and the under pale. The flowers come out upon long footſtalks, or ropes, hanging downward, each ſuſtaining five or ſix round balls of minute flowers; they come out at the ſame time as the leaves; and in warm ſummers the ſeeds ripen late in autumn, and if left on the trees will remain till ſpring, when the balls fall to pieces, and the briſtly down which ſurrounds the ſeeds helps to tranſport them to a great diſtance with the wind.

The occidental plane grows naturally in North-America; this tree alſo arrives to a great ſize; the footſtalks are longer and the leaves larger than the other ſort; they have ſeveral acute indentures on their borders, and are cut into three lobes or angles; the flowers grow in round balls, like the former, but are ſmaller. There are alſo two other ſorts, called the maple leaved plane, and the Spaniſh plane-tree, ſomewhat differing from the others in foliage. The oriental ſort was introduced into Italy in the early times of the Romans; their greateſt men took much pleaſure at their villas, which where ſurrounded with plane trees. Pliny affirms, that there was no tree whatſoever which ſo well defends from the heat of the ſun in ſummer, nor more kindly admits it in winter, than this plant, the branches being produced at a proportionable diſtance to the largeneſs of their leaves; ſo that when the leaves are fallen in winter, the branches very eaſily admit the rays of the ſun. And ſo much was this tree held in eſteem by the people of Aſia, that wherever they erected any grand buildings, the porticoes which opened to the air, terminated in groves of theſe trees. Plane trees are propagated from ſeeds, but principally by layers in this country, which will get rooted in a year, when they ſhould be planted in a nurſery for two or three years to get ſtrength, and then tranſplanted where they are intended to remain.

PLANET, *Planeta*, πλάνης, a celeſtial body, revolving round the ſun as a center, and continually changing its poſition, with reſpect to the fixed ſtars; whence the name planet, which is a Greek word, ſignifying wanderer.

The planets are uſually diſtinguiſhed into primary, and ſecondary. The primary ones, called, by way of eminence, planets, are thoſe which revolve round the ſun as a center; and the ſecondary planets, more uſually called ſatellites, or moons, are thoſe which revolve round a primary planet as a center, and conſtantly attend it in its revolution round the ſun. See SATELLITE and MOON.

The primary planets, are again diſtinguiſhed into ſuperior and inferior. The ſuperior planets, are theſe

theſe further from the ſun than our earth; as Mars, Jupiter, and Saturn: and the inferior planets, are theſe nearer the ſun than our earth, as Venus and Mercury; for the aſtronomy, and other peculiarities, of which, ſee the articles MARS, JUPITER, &c.

Nature of the PLANETS. That the planets are opake bodies, like our earth, appears evident for the following reaſons: 1. Since in Venus, Mercury, and Mars, only that part of the diſk illuminated by the ſun, is found to ſhine; and, again, Venus and Mercury, when between the earth and the ſun, appear like dark ſpots or maculæ, on the ſun's diſk; it is evident, that Mars, Venus, and Mercury, are opake bodies, illuminated with the borrowed light of the ſun. And the ſame appears of Jupiter, from its being void of light in that part to which the ſhadow of the ſatellites reaches, as well as in that part turned from the ſun; and that his ſatellites are opake, and reflect the ſun's light, is abundantly ſhewn. Wherefore, ſince Saturn, with his ring and ſatellites, only yield a faint light, fainter conſiderably than that of the fixed ſtars, though theſe be vaſtly more remote; and than that of the reſt of the planets; it is paſt all doubt, he too, with his attendants, are opake bodies. 2. Since the ſun's light is not tranſmitted through Mercury and Venus, when placed againſt him, it is plain they are denſe opake bodies; which is likewiſe evident of Jupiter, from his hiding the ſatellites in his ſhadow; and therefore, by analogy, the ſame may be concluded of Saturn. 3. From the variable ſpots in Venus, Mars, and Jupiter, it is evident theſe planets have a changeable atmoſphere; which changeable atmoſphere may, by a like argument, be inferred of the ſatellites of Jupiter, and therefore by ſimilitude the ſame may be concluded of the other planets. 4. In like manner, from the mountains obſerved in Venus, the ſame may be ſuppoſed in the other planets. 5. Since then, Saturn, Jupiter, both their ſatellites, Mars, Venus, and Mercury, are opake bodies, ſhining with the ſun's borrowed light, are furniſhed with mountains, and encompaſſed with a changeable atmoſphere; they have, of conſequence, waters, ſeas, &c. as well as dry land, and are bodies like the moon, and therefore like the earth. *Q. E. D.*

And hence, it ſeems highly probable, that the other planets have their animal inhabitants, as well as our earth.

PLANETARIUM, an aſtronomical machine, ſo called from its repreſenting the motions, orbits, &c. of the planets, agreeably to the Copernican ſyſtem.

The planetarium is more generally known by the name orrery, and therefore we have given its deſcription and uſe under that article. See ORRERY.

PLANETARY, ſomething relating to the planets.

PLANIMETRY, that part of geometry which conſiders lines and plane figures, without conſidering their hight or depth.

PLANISPHERE, ſignifies a projection of the ſphere, and its various circles on a plane; in which ſenſe maps, wherein are exhibited the meridians, and other circles of the ſpere, are planiſpheres.

PLANISPHERE, is more particularly uſed for an aſtronomical inſtrument uſed in obſerving the motions of the heavenly bodies.

PLANT, *Planta*, is defined to be an organical body, deſtitute of ſenſe and ſpontaneous motion, adhering to another body in ſuch a manner as to draw from it its nouriſhment, and having power of propagating itſelf by ſeeds. As to the parts of which a plant conſiſts, they are the root, ſtalk, branch, leaf, flower, and fruit; which ſee.

All botaniſts are of opinion that there is a certain analogy between plants and animals, ſince plants, like animals, are compoſed of certain parts, veſſels, &c. each kind of veſſel being ſuppoſed the vehicle of a different humour or juice, ſecreted from the matter of the ſap, which is conſidered as the blood or common fund of them all: two things are to be conſidered in plants, viz. the ſenſible and organic body, and the ſpirit or the vegetative body, which is the cauſe of the whole motion, and the principle of all vital functions. The ſpirit or active ſubſtance, which obtains the name of ſoul in living bodies, is not even entirely excluded from things deſtitute of life, ſince the ſubtile matter being carried by a perpetual motion, runs through the whole corporeal nature; but as it is too much diſperſed in bodies deprived of life, nor can find in them pipes and receptacles wherein it could be gathered in a greater quantity, thereby it could expel the humours it ſhould meet with, and not produce in them thoſe vital motions of nutrition and acretion; hence foſſils and other inanimated bodies are of a longer duration, becauſe not diſturbed or worn out by that vegetative and active ſubſtance: but in plants, as well as in animals, the active ſpirit continually agitated by the ſubtile matter, runs without intermiſſion throughout the whole body; and the more or leſs it is agitated, it wants a greater or leſs quantity of aliment, to avoid its feeding at laſt on the ſubſtance of the living body.

Plant and vegetable are nearly ſynonymous, every plant being a vegetable; which Boerhaave defines to be a body generated of the earth to which it adheres, and is connected with it by parts called roots, through which it receives the matter of its nouriſhment and increaſe, and conſiſts of juices and veſſels ſenſibly diſtinct from each other: or a plant is an organical body compoſed of veſſels and juices every where diſtinguiſhable from each other, to which the roots grow, or parts by which it adheres to ſome other body, and from which it derives the matter of its life and growth. This definition is very ſcien-

 tific,

tific, and furniſhes a juſt and adequate idea of a plant; for by its conſiſting of veſſels and juices, it is diſtinguiſhed from a foſſil; and by its adhering to another body, and deriving its nouriſhment therefrom, and being deſtitute of ſenſation, it is diſtinguiſhed from an animal; the mimoſa, or ſenſitive plant, approaching the neareſt to it. See FOSSIL, ANIMAL, and MIMOSA.

The veſſels, or containing parts of plants, conſiſt chiefly of earth bound or connected together by oil. In plants burnt by the intenſeſt fire, the earth or matter of the veſſels, is left intire and indiſſoluble by its utmoſt force; and conſequently the matter thereof is neither water, air, ſalt, or ſulphur, but earth alone.

The ſtudy of plants is both innocent and delightful; whoever applies himſelf to it will be ſoon agreeable ſurpriſed with the capacious field it opens for inquiry, where the human mind may range at large, and every day make freſh diſcoveries equally uſeful and entertaining. Now as every country hath its ſpontaneous plants, to raiſe and cultivate them in climates different from their own, requires much ſkill and art; for the plants of cold climates will not bear the heat of warm ones, any more than thoſe of the warm can ſupport the cold. Some of the Cape plants, in the heat of the torrid zone, grew at firſt amazingly, but ſoon after they loſt their leaves, and were with difficulty kept alive: in this there is a conſiderable latitude to be allowed, for plants may be raiſed in a climate not their own, provided the difference is not very great; for by degrees they become as it were naturalized to it (this is evident in moſt of our culinary plants, fruit-trees, wheat, &c. which originally came from foreign countries) for if they produce ſeeds, theſe ſeeds are much leſs apt to miſcarry, and produce hardier plants than ſuch as are brought immediately from their native country. Now if we attentively conſider the circumſtances in which particular plants are ſpontaneouſly produced, we ſhall directly diſcover a ſure and ſucceſsful method of cultivating them by art. Linnæus juſtly obſerves, in a curious paper upon this ſubject, in the firſt volume of the Swediſh acts, that the directions given in many books of gardening are founded merely on random practice; it being from wild plants alone that a rational method of culture can be deduced. He adds, that all plants grow ſomewhere wild, and that the buſineſs of art is to imitate their natural climate.

It was by following nature that the ingenious botaniſt abovementioned has been ſo ſucceſsful in bringing up the vaſt variety of plants that have fallen under his care. The rubus caule unifloro foliis ternatis was ſome time ago, he tells us, thought incapable of being raiſed about Stockholm, till attention to its natural climate taught him to keep it covered with ſnow during the winter and great part of the ſpring. The muſa, or plantain tree, the moſt ſpecious plant in nature, had ſtood near an hundred years in the Dutch botanical garden, and could not be made to blow; but on conſidering it was a native of Surinam, where the weather is dry for near half the year, and rainy the next, it was kept long without water, and afterwards kept watered abundantly, which cauſed it to flower and perfect its fruit; and by the ſame management, another muſa was made to flower the next year. For the botanical diſtribution of plants into claſſes, orders, genera, &c. ſee the articles BOTANY, GENUS, &c.

Paraſitical PLANTS. See PARASITES.

Senſitive PLANT. See MIMOSA.

Egg PLANT. See MELONGENA.

Foſſile PLANTS, thoſe found buried in the earth, and lodged in almoſt all the kinds of ſtrata, or ſubſtances, to be met with there.

PLANTA, in anatomy, the ſole of the foot. See the article FOOT.

PLANTAIN, *Plantago*, in botany, a genus of plants, whoſe flower is monopetalous, with a cylindrically globoſe tube, and a depreſſed limb cut into four ſegments; the ſtamina are four erect, long, capillary filaments, topped with oblong, compreſſed, incumbent antheræ. The fruit is an ovate, bilocular capſule, containing many oblong ſeeds. The common broad-leaved plantain, which flowers in May or June, is a great cooler, and ſtopper of fluxes of all kinds, particularly hæmorrhages, whether from the noſe, mouth, or uterus; it is likewiſe accounted a great healer of freſh wounds: the decoction is an excellent gargle in ulcers of the mouth; and, with lime-water, it cures ulcers in the legs: alſo made into an ointment, with freſh butter, it is ſaid to cure the piles. Ribwort and bucks-horn plantain are of this genus, and agree with the common plantain in virtues.

PLANTAIN-TREE, *Muſa*, in botany, a genus of plants, producing male and female flowers; the corolla of which is unequal and ringent; an erect, ligulated petal, cut into five indentures at the extremity, conſtitutes the upper lip, and a monophyllous, heart-ſhaped nectarium, the under one: the ſtamina are ſix ſubulated filaments, five of which are inſerted in the petal, and the ſixth in the nectarium, and double the length of the others; this is terminated with a linear antheræ, the others having none. The fruit is an oblong fleſhy berry, covered with a thick rind.

The plantain-tree is cultivated in the Weſt-Indian iſlands; it riſes with a ſoft herbaceous ſtalk fifteen feet high, and upwards; the lower part is eight or nine inches diameter, diminiſhing gradually to the top, where the leaves come out on every ſide; theſe are often ſix feet long, and near two feet broad, having a ſtrong fleſhy mid-rib, and a great number of tranſverſe veins running from it toward the edges: theſe leaves come out from the center of

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the ſtalk, and are rolled up at their firſt appearance; but when they are advanced above the ſtalk, they expand quite flat and turn backwards: when the plant is grown to its full height, the flowers will appear in ſpikes in the center, which are often four feet in length; on the lower part of the ſpike they are largeſt, diminiſhing in their ſize upwards; each of theſe ſpikes is covered with a ſheath of a fine purple colour withinſide, which drops off when the flowers open: the upper part of the ſpike is covered with barren flowers, which fall off with their covers. The fruit is about eight or nine inches long, and above an inch diameter, having three blunt angles, and is a little incurved; it is at firſt green, but when ripe, of a pale-yellow colour; the ſkin is tough, and within is a ſoft pulp of a luſcious ſweet flavour: the ſpikes of fruit are often ſo large, as to weigh upward of forty pounds each.

This fruit in the Weſt-Indies is generally cut before it is ripe, and roaſted in the embers and eaten by the negroes as bread. The leaves are uſed for napkins and table-cloths, and are likewiſe food for hogs.

Of this genus, the banana is a ſpecies. See the article BANANA.

PLANTARIS, in anatomy, one of the extenſor muſcles of the foot, which has its origin from the interior part of the external condyle.

PLANTATION, in the Weſt-Indies, denotes a ſpot of ground, which a planter, or perſon arrived in a new colony, pitches on to cultivate for his own uſe, or is aſſigned for that purpoſe. However, the term plantation is often uſed in a ſynonymous ſenſe with colony.

PLANTING, in agriculture and gardening, is ſetting a tree or plant taken from its proper place, in a new hole or pit; throwing freſh earth over its root, and filling up the hole to the level of the ſurface of the ground.

The firſt thing in planting, is to prepare the ground, before the trees or plants are taken out of the earth, that they may remain out of the ground as ſhort a time as poſſible; and the next is to take up the trees, or plants, in order to their being tranſplanted.

In taking up the trees, carefully dig away the earth round the roots, ſo as to come at their ſeveral parts to cut them off; for if they are torn out of the ground without care, the roots will be broken and bruiſed to the great injury of the trees. When you have taken them up, the next thing is to prepare them for planting by pruning the roots and heads. And firſt, as to the roots, all the ſmall fibres are to be cut off, as near to the place from whence they are produced, as may be, except they are to be replanted immediately after they are taken up. Then prune off all the bruiſed or broken roots, all ſuch as are irregular, and croſs each other, and all downright roots, eſpecially in fruit-trees: ſhorten the larger roots in proportion to the age, the ſtrength, and nature of the tree; obſerving that the walnut, mulberry, and ſome other tender-rooted kinds ſhould not be pruned ſo cloſe as the more hardy ſorts of fruit and foreſt-trees: in young fruit-trees (ſuch as apples, pears, plumbs, peaches, &c.) that are one year old from the time of their budding or grafting, the roots may be left only about eight or nine inches long; but in older trees, they muſt be left of a much greater length: but this is only to be underſtood of the larger roots; for the ſmall ones muſt be chiefly cut quite out, or pruned very ſhort.

The next thing is the pruning of their heads, which muſt be differently performed in different trees; and the ſize of the trees muſt alſo be conſidered: thus, if they are deſigned for walls or eſpaliers, it is beſt to plant them with the greateſt part of their heads, which ſhould remain on till they begin to ſhoot in the ſpring, when they muſt be cut down to five or ſix eyes, at the ſame time taking care not to diſturb the roots. But if the trees are deſigned for ſtandards, you ſhould prune off all the ſmall branches cloſe to the place where they are produced, as alſo the irregular ones which croſs each other; and after having diſplaced theſe branches, you ſhould alſo cut off all ſuch parts of branches, as have by any accident been broken or wounded; but by no means cut off the main leading ſhoots which are neceſſary to attract the ſap from the root, and thereby promote the growth of the tree.

Having thus prepared the trees for planting, you muſt now proceed to place them in the earth; but firſt; if the trees have been long out of the ground, ſo that the fibres of the roots are dried, place them eight or ten hours in water, before they are planted, with their heads erect, and the roots only immerſed therein, which will ſwell the dried veſſels of the roots, and prepare them to imbibe nouriſhment from the earth. In planting them, great regard muſt be had to the nature of the ſoil; for if that be cold and moiſt, the trees ſhould be planted very ſhallow; and if it be a hard rock or gravel, it will be better to raiſe a hill of earth where each tree is to be planted, than to dig into the rock or gravel and fill it up with earth, as is too often practiſed, by which means the trees are planted as it were in a tub, and have but little room to extend their roots.

The next thing to be obſerved, is to place the trees in the hole in ſuch a manner that the roots may be about the ſame depth in the ground, as before they were taken up: then break the earth fine with a ſpade, and ſcatter it into the hole, ſo that it may fall in between every root, that there may be no hollowneſs in the earth: then, having filled up the hole, gently tread down the earth with your feet, but do not make it too hard, which is a great fault, eſpecially if the ground be ſtrong or wet.

Having thus planted the trees, they ſhould be faſtened to ſtakes driven into the ground, to prevent their

their being displaced by the wind, and some mulch laid upon the surface of the ground about their roots: as to such as are planted against walls, their roots should be placed about five or six inches from the wall, to which their heads should be nailed, to prevent their being blown up by the wind.

The seasons for planting are various, according to the different sorts of trees, or the soil in which they are planted: for the trees whose leaves fall off in winter, the best time is the beginning of October, provided the soil be dry; but if it be a very wet soil, it is better to defer it till the latter end of February, or the beginning of March; and for many kinds of evergreens, the beginning of April is by far the best season; though they may be safely removed at Midsummer, provided they are not to be carried very far; but you should always make choice of a cloudy wet season. *Miller's Gard. Dict.*

Reverse PLANTING, a method of planting, in which the natural position of the plant, or shoot, is inverted; the branches being set into the earth, and the root reared into the air.

Dr. Agricola mentions this monstrous method of planting, which he found to succeed very well, in most or all sorts of fruit-trees, timber-trees, &c. Bradley affirms, that he has seen a lime-tree in Holland growing with its first roots in the air, which had shot out branches in great plenty, at the same time that its first branches produced roots and fed the tree.

Mr. Fairchild, of Hoxton, has practised the same with us, and gives the following directions for performing it: Make choice of a young tree of one shoot, of alder, elm, willow, or any other tree that easily takes root by laying; bend the shoot gently down into the earth, and so let it remain till it has taken root. Then dig about the first root, and raise it gently out of the ground, till the stem be nearly upright, and then stake it up. Then prune the roots, now erected in the air, from the bruises and wounds they received in being dug up, and anoint the pruned parts with a composition of two ounces of turpentine, four ounces of tallow, and four ounces of bees-wax, melted together, and applied pretty warm. Afterwards prune off all the buds or shoots that are upon the stem, and dress the wounds with the same composition, to prevent any collateral shootings, that might spoil the beauty of the stem.

PLANTING, in architecture, the laying the first course of stones, in the foundations of buildings. See the article FOUNDATION.

PLASTER, *Emplastrum*, in pharmacy, is defined to be an external application, of a harder consistence than our ointments: these are to be spread according to the different circumstances of the place, wound, or patient, either upon linen or leather.

If the part upon which they are to be laid be naturally hairy, it must be shaved; but that they may stick the better, the natural shape of the part must be consulted, and the plaster spread and formed accordingly, either round, square, triangular, elliptical, in a lunar form, or in the shape of the letter T. Some also are divided at both ends, and others are perforated in the middle; these last are of frequent use in fractures attended with a wound; for by this contrivance, the wound may be cleansed and dressed without removing the plaster.

These plasters are of different forms, according to the part they are laid on; but they are usually square, or round: and, indeed, there is almost no part of the body which a plaster, of one of those forms, may not be made to serve for, if it be notched about the edges with a pair of scissars.

The uses of plasters are various; they are serviceable in securing the dressings, they also forward the maturation of the pus, agglutinate and heal wounds, unite broken bones, heal burns, assuage pain, and strengthen weak parts.

The common plaster is made by boiling one gallon of oil-olive, with five pounds of litharge finely powdered, in about a quart of water, over a gentle fire, and continually stirring them, till the oil and litharge are united, and the whole acquires the consistence of a plaster.

The quicksilver-plaster is made thus: Take of the common-plaster one pound, of quicksilver three ounces, and of the simple balsam of sulphur a dram, and, lastly, let them be incorporated.

A cephalic is ordered by the college to be made of two pounds of Burgundy pitch, one pound of soft labdanum, and yellow rosin and yellow wax, of each four ounces; one ounce of what is called the expressed oil of mace: the pitch, rosin, and wax, being first melted together, add first the labdanum, and then the oil of mace.

A strengthening plaster is made, by adding to two pounds of the common plaster melted, half a pound of frankincense, and three ounces of dragon's-blood, both reduced to powder.

A drawing plaster is made thus: Take yellow rosin and yellow wax, of each three pounds; of tried mutton-suet one pound; melt all together, and strain the mixture for use.

The blistering plaster is made thus: Take of the drawing plaster two pounds, of cantharides one pound, of vinegar half a pint; the plaster being melted, a little before it hardens, sprinkle in the cantharides, reduced to a very fine powder; then add the vinegar, and beat all well together.

There are several other forms of plasters, for which we must refer the reader to the dispensatories.

PLASTER, among builders, &c. The plaster of Paris is a preparation of several species of gypsums, dug near Mont Maitre, a village in the neighbourhood of Paris; whence the name. See the article GYPSUM.

The best sort is hard, white, shining, and marbly;

bly; known by the names of plaſter-ſtone, or parget of Mont Maitre. It will neither give fire with ſteel, nor ferment with aqua-fortis, but very freely and readily calcines in the fire into a very fine plaſter; the uſe of which in building, and caſting ſtatues, is well known. See the article STUCCO.

As the modern taſte runs greatly into plaſtering, it were to be wiſhed that this art could be brought into its ancient perfection. The plaſters of the Romans were exceeding durable; witneſs ſeveral yards of it ſtill to be found on the top of the pont de Garde, near Niſmes. At Venice they uſe a very durable plaſter; but, as the ſecret of preparing it is not known among us, it would be worth while to try whether ſuch a ſubſtance might not be made, by boiling the powder of gypſum dry over the fire, for it will boil in the manner of water; and when this boiling or recalcining was over, the mixing with it roſin, or pitch, or both together, with common ſulphur, and the powder of ſea-ſhells. If theſe were all mixed together, and the water added to it hot, and the matter all kept hot upon the fire till the inſtant of its being uſed, ſo that it might be laid on hot, it is poſſible this ſecret might be hit upon.

Wax and oil of turpentine might alſo be tried as additions: theſe being the common ingredients in ſuch cements as we have accounts of are the firmeſt. Strong ale wort is by ſome directed to be uſed, inſtead of water, to make mortar of lime-ſtone be of a more than ordinary ſtrength. It is poſſible, that the uſe of this tenacious liquor, in the powdered ingredients of this propoſed plaſter, might greatly add to their ſolidity and firmneſs.

PLASTIC, πλαστικος, denotes a thing endued with a formative power, or a faculty of forming or faſhioning a maſs of matter, after the likeneſs of a living being; ſuch a virtue as ſome of the ancient Epicureans, and perhaps the Peripatetics too, imagined to reſide in the earth, or, at leaſt, to have anciently reſided therein; by means whereof, and without any extraordinary intervention of a creator, it put forth plants, &c.

Some of them ſeem to be of opinion, that animals, and even man himſelf, was the effect of this plaſtic power.

PLASTICE, the plaſtic art, a branch of ſculpture, being the art of forming figures of men, birds, beaſts, fiſhes, &c. in plaſter, clay, ſtuc, or the like.

PLAT-VEINS, in the manege, the veins wherein we bleed horſes, one in the lower part of each ſhoulder, and the other in the flat part of the thighs.

PLATS *of a Ship*, flat ropes made of rope-yarn, and weaved one over the other; they ſerve to ſave the cable from galling in the hawſe, or to wind about the flukes of the anchors, to ſave the pennant of the fore-ſheet from galling againſt them.

PLATBAND *of a Door or Window*, is uſed for the lintel, where that is made ſquare, or not much arched; theſe platbands are uſually croſſed with bars of iron when they have a great bearing, but it is much better to eaſe them by arches of diſcharge built over them.

PLATBANDS *of Flutings*, are the liſts or fillets between the flutings of columns.

PLATE, in commerce, ſignifies gold or ſilver wrought into veſſels, for domeſtic uſes.

PLATE, in heraldry, is a round flat piece of ſilver, without any impreſſion; but, as it were, formed ready to receive it.

PLATE, is alſo a term uſed by our ſportſmen, to expreſs the reward given to the beſt horſes at our races.

PLATES, in gunnery. The priſe-plates are two plates of iron on the cheeks of a gun-carriage, from the cape-ſquare to the center, through which the priſe-bolts go, and on which the handſpike reſts when it poiſes up the breech of the piece.

Breaſt-plates are the two plates on the face of the carriage, one on each cheek. Train-plates are the two plates on the cheeks, at the train of the carriage. Dulidge-plates are the ſix plates on the wheel of a gun-carriage, where the fellows are joined together, and ſerve to ſtrengthen the dulidges.

PLATFORM, in the military art, an elevation of earth, on which cannon is placed, to fire on the enemy; ſuch are the mounts in the middle of curtins: on the rampart there is always a platform, where the cannon are mounted.

It is made by the heaping up of earth on the rampart, or by an arrangement of madriers, riſing inſenſibly, for the cannon to roll on, either in a caſemate, or on attack in the outworks.

PLATFORM, in architecture, is a row of beams, which ſupport the timber-work of a roof, and lie on the top of the wall, where the entablature ought to be raiſed.

This term is likewiſe uſed for a kind of terrace, or broad, ſmooth, open walk, at the top of a building, from whence a fair proſpect may be taken of the adjacent country. Hence an edifice is ſaid to be covered with a platform, when it is flat at top, and has no ridge. Moſt of the oriental buildings are thus covered, as were all thoſe of the ancients.

PLATFORM, or ORLAP, in a man of war, a place on the lower deck, abaft the main-maſt, between it and the cockpit, and round about the main capſtan, where proviſion is made for the wounded men in time of action.

PLATONIC, ſomething that relates to Plato, his ſchool-philoſophy, opinions, or the like; thus, Platonic love, denotes a pure ſpiritual affection, for which Plato was a great advocate, ſubſiſting between the different ſexes, abſtracted from all carnal appetites, and regarding no other objects but the

mind and its beauties: or it is even a ſincere diſintereſted friendſhip, ſubſiſting between perſons of the ſame ſex, abſtracted from any ſelfiſh views, and regarding no other object than the perſon, if any ſuch love or friendſhip has aught of a foundation in nature.

PLATONIC YEAR, or the great year, is a period of time determined by the revolution of the equinoxes, or the ſpace wherein the ſtars and conſtellations return to their former places in reſpect of the equinoxes.

The Platonic year, according to Tycho Brahe, is 25816 years; according to Ricciolus, 25920; and according to Caſſini, 24800. See the article PRECESSION *of the Equinoxes*.

This period once accompliſhed, it was an opinion among the ancients, that the world was to begin anew, and the ſame ſeries of things to turn over again.

PLATONISM, the doctrine and ſentiments of Plato and his followers, with regard to philoſophy, &c. See the article ACADEMIC.

PLATTOON, or PLOTTOON, in the military art, a ſmall ſquare body of forty or fifty men, drawn out of a battalion of foot, and placed between the ſquadrons of horſe, to ſuſtain them; or in ambuſcades, ſtreights, and defiles, where there is not room for whole battalions or regiments.

Plattoons are alſo uſed when they form the hollow-ſquare, to ſtrengthen the angles. The grenadiers are generally poſted in platoons.

PLEA, in law, is what either party alledges for himſelf in court, in a cauſe there depending; and, in a more reſtrained ſenſe, it is the defendant's anſwer to the plaintiff's declaration.

Pleas are uſually divided into thoſe of crown and common pleas. Pleas of the crown are all ſuits in the king's name, or in the name of the attorney-general on his behalf, for offences committed againſt his crown and dignity, and againſt his peace; as treaſon, murder, felony, &c. Common-pleas are ſuch ſuits as are carried on between common perſons, in civil caſes. Theſe pleas may be divided into as many branches as there are actions.

To an action there is either a general or a ſpecial plea: and here, a general plea is a general anſwer to the declaration, as in a debt or contract; the general plea is, that he owes nothing; in a debt upon bond, that it is not his deed, or he paid it on the day; in an action on a promiſe, that he made no promiſe; and in a treſpaſs, not guilty. Special pleas are either in bar to the action brought, or in abatement of the writ on which the action is framed. All pleas are to be ſuccinct, without any unneceſſary repetitions, and muſt be direct and pertinent to the caſe.

PLEADING, in law, a ſpeech uttered at the bar in defence of a cauſe: but, in a ſtricter ſenſe, pleadings are all the allegations of the parties to a ſuit, made after the declaration, till the iſſue is joined.

In this ſenſe, they expreſs what is contained in the bar, replication, and rejoinder; and not what is in the declaration itſelf. Hence, defaults in the matter of declaration are not confined within the miſpleading.

PLEBEIAN, *Plebeius*, any perſon of the rank of the common people.

It is chiefly uſed in ſpeaking of the ancient Romans, who were divided into ſenators, knights, and plebeians or commons.

PLEDGE, *Plegius*, in common law, a ſurety, either real or perſonal, which the plaintiff is to find, for proſecuting the ſuit.

PLEDGERY, or PLEGGERY, ſuretiſhip, or an anſwering for another perſon.

PLEDGET, BOLSTER, or COMPRESS, *Plumaceolus*, in ſurgery, a kind of flat tent, laid over a wound, to imbibe the ſuperfluous humours, and keep it clean. See the article WOUND.

PLEIADES, *Vergiliæ*, in aſtronomy, an aſſemblage of ſtars in the neck of the conſtellation Taurus. See TAURUS.

PLENARTY, in law, is when a church benefice is full of an incumbent.

PLENARY, ſomething complete or full.

PLENILUNIUM, in aſtronomy, that phaſis of the moon commonly called the full moon. See the article MOON.

PLENIPOTENTIARY, a perſon veſted with full power to do any thing. See the article EMBASSADOR.

PLENITUDE, *Plenitudo*, the quality of a thing that is full, or that fills another.

In medicine, it chiefly denotes a redundancy of blood and humours. See the article PLETHORA.

PLENUM, in phyſics, denotes, according to the Carteſians, that ſtate of things, wherein every part of ſpace is ſuppoſed to be full of matter; in oppoſition to a vacuum. See VACUUM.

PLEONASM, *Pleonaſmus Redundantia*, a figure in rhetoric, whereby we uſe words ſeemingly ſuperfluous, in order to expreſs a thought with the greater energy: ſuch as, I ſaw it with my own eyes, &c.

This grammarians uſually reckon a fault in diſcourſe.

PLEROTICS, *Plerotica*, in medicine, a kind of remedies that are healing, or that fill up the fleſh: otherwiſe called incarnatives and ſarcotics. See the article SARCOTICS.

PLETHORA, in medicine, a greater redundance of laudable blood and humours than is capable of undergoing thoſe changes which muſt neceſſarily happen for the purpoſes of life, without inducing diſeaſes.

A plethora is cured by veneſection, exercise, watchings, a ſharp and acrid diet, after due evacuation,

evacuations, and by a gradual omiſſion of theſe evacuations.

PLETHORIC, *Plethoricus*, a perſon abounding with blood, or labouring under a plethora.

PLEVIN, *Plevina*, in law, the ſame with pledge. See PLEDGE.

PLEURA, in anatomy, a ſmooth, robuſt, and tenſe membrane, adhering to the ribs and to the intercoſtal muſcles, and ſurrounding the whole cavity of the thorax. Its ſtructure reſembles two ſacks, one of which ſurrounds one ſide of the thorax, and the other the other ſide, and each of them contains one of the two lobes of the lungs: from the conjunction of theſe two ſacculi of the pleura, in the middle of the thorax, is formed the mediaſtinum.

PLEURISY, πλευρίτις, in medicine, a violent pain in the ſide, attended with an acute fever, a cough, and a difficulty of breathing.

This diſorder effects all the parts of the internal integuments of the thorax, the whole of the pleura, and the whole of the mediaſtinum; and therefore, when it is ſeated in the membrane internally lining the ribs, it is called a true or internal pleuriſy; but when it chiefly occupies the external parts, and only the intercoſtal muſcles, and thoſe above them, are affected, it is called a ſpurious or baſtard pleuriſy.

The pleuriſy is moſt predominent between the ſpring and ſummer. It begins with chilneſs and ſhivering, which are ſoon ſucceeded by heat, thirſt, inquietude, and the other common ſymptoms. After a few hours, the patient is ſeized with a violent pricking pain in one of his ſides, about the ribs, which ſometimes extends itſelf towards the ſhoulder-blades, ſometimes towards the back-bone, and ſometimes towards the fore-parts of the breaſt, and this is attended with frequent coughing. The matter which the patient ſpits, is at firſt little and thin, and mixed with particles of blood; but as the diſeaſe advances, it is more plentiful and more concocted, but not without a mixture of blood. The pulſe is remarkably ſtrong, and ſeems to vibrate like a tenſe ſtring of a muſical inſtrument; and the blood drawn from a vein, as ſoon as it is cold, looks like melted ſuet. As to the ſpitting, it is frequently abſent, and hence pleuriſies are diſtinguiſhed into moiſt and dry.

As in all inflammatory fevers, ſo in this, too hot a regimen is to be ſhunned, both with reſpect to the bed-cloaths and the heat of the room; nor muſt the patient be expoſed to the cold air, nor drink things actually cold. Hoffman obſerves, that all ſtrong ſudorifics and cathartics are hurtful; and that if the patient has three or four ſtools, the courſe of nature muſt not be ſtopped. The diet ſhould be cooling, relaxing, ſlender, and diluting. Moiſtening things taken warm, are preferable to all others; and hence barley or oatmeal-gruel, ſweetened with honey, and alſo ſweet whey, are proper. If the phyſician is called before the third day, Boerhaave directs a large quantity of blood to be let, from a wide orifice in a large veſſel, and to fetch deep ſighs, or cough, to promote its celerity; and the part affected ſhould be rubbed gently at the ſame time, and the bleeding continued till the pain remits, or the patient is ready to faint. This ſhould be repeated as often as the ſymptoms return, which it was intended to remove, and till the abſence of the white inflammatory pellicle from the ſurface of the blood when cold, ſhews it is time to leave it off. This Huxham confirms by his own experience, and adds, that after the fourth day, bleeding is not ſafe; he alſo recommends fomenting the part, which often eaſes the pain, and terminates the diſeaſe; but if it is obſtinate, he recommends ſlight ſcarifications, then cupping, and afterwards a bliſter on the ſame place; which has been ſucceſsful, when the uſual methods failed. The patient's body ſhould be kept open, for which purpoſe emollient clyſters are proper; and he ſhould, at the ſame time, take large quantities of ſtrong, diluting, aperient, and antiſeptic liquors; for this purpoſe, take the leaves of jack-by-the-hedge, and white horehound, each two ounces; boil them in two pints of water, with which mix of the oxymel of ſquills eight ounces; of nitre, three drams; and of treacle-vinegar, one ounce; of this mixture let the patient, every quarter of an hour, take two ounces, as warm as poſſible.

Dr. Mead obſerves, on the treatment of this diſorder, that after drawing as much blood as is neceſſary, draughts with freſh-drawn linſeed-oil, are of great ſervice for eaſing the cough; nitre, for allaying the heat; and for diſſolving the ſizy blood that obſtructs the ſmall canals, wild goat's blood and volatile ſalts; and, laſtly, a bliſter laid on the part affected, in order to draw fourth the peccant humour.

A purulent abſceſs or empyema is ſometimes formed in this diſeaſe, for the treatment of which, ſee EMPYEMA.

As to the baſtard-pleuriſy, Hoffman ſays that it is properly a kind of rheumatiſm, and does not require bleeding, unleſs the patient is plethoric, but a diaphoreſis and a more free perſpiration. Lanciſi, however, adviſes plentiful bleeding in the arm, ſcarifying the part affected, and cupping: and during the cure, it is neceſſary to keep the body open, and the bowels free from ſpaſms; for which purpoſe emollient clyſters are proper, with oil of ſweet-almonds.

PLEUROPNEUMONY, in medicine, a diſeaſe partaking of the nature both of a pleuriſy and peripneumony. See the articles PLEURISY and PERIPNEUMONY.

PLEXUS, among anatomiſts, a bundle of ſmall veſſels interwoven in the form of net-work; thus a congeries

congeries of veſſels within the brain is called plexus choroides, reticularis, or retiformis. See the article *Plexus* CHOROIDES.

A plexus of nerves is an union of two or more nerves, forming a ſort of ganglion or knot.

PLICA POLONICA, in medicine, a diſeaſe of the hair, almoſt peculiar to Poland and Lithuania, and hence denominated polonica. It conſiſts of a preternatural bulk of hair, which being firmly conglutinated and wrapped up in inextricable knots, and extended to a monſtrous length, affords a very unſeemly ſpectacle. When theſe are cut off, the blood is diſcharged from them, the head racked with pain, the ſight impaired, and the patient's life frequently endangered.

PLICATED, ſomething folded together, one part over another; as the leaves of certain plants, &c.

PLINIA, in botany, a genus of plants, the flower of which conſiſts of a plane petal divided into five ovate concave ſegments; the filaments are numerous, hairy, and topped with ſmall antheræ. The fruit is a large, globoſe, unilocular berry, containing one large, globoſe, ſmooth ſeed.

PLINTH, ORLE, or ORLO, in architecture, a flat ſquare member, in the form of a brick.

It is uſed as the foundation of columns, being that flat ſquare table, under the moulding of the baſe and pedeſtal at the bottom of the whole order. It ſeems to have been originally intended to keep the bottom of the original wooden pillars from rotting.

Vitruvius alſo calls the Tuſcan abacus, plinth.

PLINTH *of a Statue*, &c. is a baſe, either flat, round, or ſquare, that ſerves to ſupport it.

PLINTH *of a Wall*, denotes two or three rows of bricks advancing out from a wall; or, in general, any flat high moulding, that ſerves in a front wall to mark the floors, to ſuſtain the eaves of a wall, or the larmier of a chimney.

PLOT, in dramatic poetry, is ſometimes uſed for the fable of a tragedy or comedy, but more particularly the knot or intrigue, which makes the embarras of any piece. The unravelling puts an end to the plot.

PLOT, in ſurveying, the plan or draught of any field, farm, or manor, ſurveyed with an inſtrument, and laid down in the proper figures and dimenſions.

PLOTTING, among ſurveyors, is the art of laying down on paper, &c. the ſeveral angles and lines of a tract of ground ſurveyed by a theodolite, &c. and a chain.

In ſurveying with the plain-table, the plotting is ſaved; the ſeveral angles and diſtances being laid down on the ſpot, as faſt as they are taken. See the article PLAIN-TABLE.

But, in working with the theodolite, ſemicircle, or circumferentor, the angles are taken in degrees; and the diſtances in chains and links; ſo that there remains an after-operation to reduce theſe members into lines, and ſo to form a draught, plan, or map; this operation is called plotting.

Plotting then is performed by means of two inſtruments, the protractor, and plotting-ſcale. By the firſt, the ſeveral angles obſerved in a field with a theodolite, or the like, and entered down in degrees in the field-book, are protracted on paper in their juſt quantity.

By the latter, the ſeveral diſtances meaſured with the chain, and entered down in like manner in the field-book, are laid down in their juſt proportion.

Under the articles protractor and plotting-ſcale, are found ſeverally the uſe of their reſpective inſtruments in the laying down of angles and diſtances: in which alſo are given their uſe conjointly in the plotting of a field, ſurveyed either with the circumferentor or theodolite.

PLOUGH, in agriculture, a machine for turning up the ſoil, contrived to ſave the time, labour, and expence that without this inſtrument muſt have been employed in digging land, to prepare it for the ſowing of all kinds of grain.

PLOUGHMAN'S-SPIKENARD. See the articles BACCHARIS and CONYZA.

PLOUGHING, or PLOWING, in agriculture, turning up the earth with a plough. Ploughing is principally either that of lays or fallows. Ploughing of lays, is the firſt cutting up of graſs-ground for corn, and is a work commonly performed in January. The beſt time for doing it is when the land is wet, becauſe the turf is then ſoft and tough, and will turn up without breaking. In the well turning of this conſiſts the chief part of this ſort of ploughing, which if rightly performed, will lay the turf ſo flat and true, that it can hardly be ſeen where the plough went. This, indeed, depends greatly upon the make of the plough; but if the earth-board does not turn the turf well, ſome nail upon it a ſmall piece of wood, to take the upper part of the earth as it riſes upon the earth-board, which cauſes it to fall with the graſs ſide downwards. Ploughing of fallows, called alſo fallowing, is preparing land by ploughing long before it is ploughed for ſeed. See the article FALLOWING.

PLUKENETIA, in botany, a genus of plants producing male and female flowers, the corolla of each conſiſts of four ovate patent petals; the male flower hath eight very ſhort filaments, joining at their baſe, and topped with erect antheræ: the female flower hath a quadrangular germen, which becomes a depreſſed capſule, with keel-ſhaped angles, containing four cells, incloſing in each a roundiſh compreſſed ſeed.

PLUM-TREE, *Prunus*, in botany, a genus, whoſe flower conſiſts of five roundiſh concave petals, inſerted in the cup, with upwards of twenty ſtamina: the fruit is either a roundiſh or oval drupe,

drupe, with a longitudinal furrow, containing a compreſſed and acute pointed nut, with the ſutures ſtanding out each way in an edge.

The plum tree, it is ſaid, is a native of Armenia, and the country about Damaſcus, from whence they were firſt brought to Italy, and from thence to the other European countries.

As there are a conſiderable number of ſorts of plums, we ſhall only mention a few of the beſt. 1. The perdigron plum. 2. The violet perdigron. 3. The white perdigron. 4. The myrobalan. 5. The green gage. 6. The drap d'or. 7. St. Catherine. 8. Mirabelle. 9. The damaſk violet. 10. The Orleans; this is the moſt common. 11. The imperial. 12. The mogul; theſe two laſt are good for baking, or ſweet-meats: to which may be added, ſeveral other ſorts, together with the damaſon, ſloe, black and white bullace, which grow in the hedges, and are fit for tarts, the damaſon in particular. They are propagated by inoculation, on wild plum ſtocks, and may be trained either for dwarf, eſpalier, wall, or ſtandard trees. Plum trees do not only produce their fruit upon the laſt year's wood, but alſo upon curſons or ſpurs, which come out of wood that is many years old; therefore on thoſe againſt walls, or eſpaliers, there is no neceſſity for ſhortening the branches, in order to obtain new ſhoots annually in every part of the tree (as is practiſed with peaches and nectarines) ſince the more theſe trees are pruned, the more luxuriant they grow, until the ſtrength of them is exhauſted, and then they gum and ſpoil; therefore the beſt method to manage theſe trees, is to lay in their ſhoots horizontally as they are produced, at equal diſtances, in proportion to the length of their leaves, and during the growing ſeaſon all foreright ſhoots ſhould be diſplaced, and ſuch as are to remain, ſhould be gradually trained to the wall or eſpalier, which will not only render them beautiful, but alſo give to each an equal advantage of ſun and air, and hereby the fruit will be always kept in a ductile growing ſtate, which they ſeldom are when overſhadowed with ſhoots ſome part of the ſeaſon, and then ſuddenly expoſed to the air and ſun. Plum trees require a ſoil neither too moiſt or too dry, and thoſe which are planted againſt walls, ſhould have a ſouth-eaſt, ſouth-weſt, or weſt aſpect, which is more kindly for them than the ſouth expoſure; and ſome of the hardier ſorts may be planted againſt a north aſpected wall: plums gathered a day before they are eaten, and kept in nettles, are rather finer flavoured than freſh from the tree, when gathered in the middle of the day; they are in general moiſtening, laxative, and emollient (except the bullace and ſloes, which are aſtringent) they are alſo cooling, quench thirſt, and create an appetite, and therefore they agree beſt with hot conſtitutions, but they do not at all agree with thoſe that have weak ſtomachs. In thoſe years that plums are very plenty, and conſequently much eaten by all ſorts of people, fluxes of the belly generally abound, which often turn to bloody-fluxes, hence it appears that they always ſhould be eaten with moderation, and ſhould be quite ripe and ſound.

Braſilian-PLUM. See the article SPONDIAS.

Hog-PLUM. See SPONDIAS.

PLUMAGE, the feathers which ſerve birds for a covering.

Plumage, is, in falconry, particularly underſtood of the feathers under a hawk's wing. Falconers give their hawks ſmall feathers to make them caſt, and theſe alſo they call plumage.

PLUMB LINE, among artificers, denotes a perpendicular to the horizon; ſo called as being commonly erected by means of a plummet. See PLUMMET.

PLUMBAGO, leadwort, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped, the tube is cylindric and narrow at the top, and the limb is cut into five oval ſpreading ſegments: the ſtamina are five ſubulated filaments, topped with ſmall oblong verſatile antheræ: the ſeed is ovate and ſingle, and included in the cup.

PLUMBAGO, mock-lead, in mineralogy, a foſſile ſubſtance reſembling lead-ore, much uſed in drawing, and for making pencils.

PLUMBERY, the art of caſting and working lead, and uſing it in buildings, &c. See the article LEAD.

PLUMBUM, lead, in natural hiſtory. See the article LEAD.

PLUMERIA, in botany, a genus of plants, whoſe flower is monopetalous, and funnel-ſhaped, with a long tube, and divided into five oblong ovate ſegments; at the limb, in the center of the tube, are placed five ſubulated filaments, terminated with connivent antheræ. The fruit is compoſed of two long ventricoſe acuminated follicles, which are formed of one valve each, containing a number of oblong imbricated winged ſeeds. This genus, being natives of the Weſt Indies, they require a hot-houſe in this climate for their preſervation. They abound with a milky cauſtic juice, which is reckoned poiſonous: in cutting off any of the branches of theſe plants, if the knife be not immediately cleaned, the juice will corrode it, and turn the blade almoſt black in a very little time, ſo as not to be cleaned off again, and if dropped upon linen, will cauſe it to waſh in holes equal to aqua-fortis.

PLUMMET, PLUMB-RULE, or PLUMB-LINE, an inſtrument uſed by carpenters, maſons, &c. in order to judge whether walls, &c. be upright planes, horizontal, or the like. It is thus called from a piece of lead, *plumbum*, faſtened to the end of a chord, which uſually conſtitutes this inſtrument. Sometimes the ſtring deſcends along a wooden ruler, &c. raiſed perpendicularly on another; in which caſe it becomes a level. See LEVEL.

PLUMMING, among miners, is the method of uſing a mine-dial, in order to know the exact place of the work where to ſink down an air-ſhaft, or to bring an adit to the work, or to know which way the load inclines when any flexure happens in it.

PLUMOSE, ſomething formed in the manner of feathers, with a ſtem and fibres iſſuing from it on each ſide: ſuch are the antennæ of certain moths, butterflies, &c.

PLUNGER, in mechanics, the ſame with the forcer of a pump. See the article FORCER.

PLURAL, *Pluralis*, in grammar, an epithet applied to that number of nouns and verbs which is uſed when we ſpeak of more than one thing; or that which expreſſes a plurality or number of things. See NUMBER.

PLURALITY, *pluralitas*, a diſcrete quantity, conſiſting of two or a greater number of the ſame kind: thus we ſay a plurality of gods, &c.

Hence plurality of benefices, or livings, is where the ſame clerk is poſſeſſed of two or more ſpiritual preferments, with cure of ſouls.

PLUS, in algebra, a character marked thus +, uſed for the ſign of addition. See the article CHARACTER.

PLUSH, in commerce, &c. a kind of ſtuff, leaving a ſort of velvet knap, or ſhag, on one ſide, compoſed regularly of a woof of a ſingle woollen thread and a double warp, the one wool, of two threads twiſted, the other goats or camels hair; though there are ſome pluſhes entirely of worſted, and others compoſed wholly of hair.

PNEUMATICS, called alſo pneumatology and pneumatoſophy, among ſchoolmen, the doctrine and contemplation of ſpirits and ſpiritual ſubſtances, as God, angels, and the human ſoul, in which ſenſe pneumatics are the ſame with what we otherwiſe call metaphyſics. See the article METAPHYSICS.

PNEUMATICS is more commonly uſed among us, for that part of natural philoſophy which treats of the nature and properties of the air.

PNEUMONICS, in pharmacy, medicines proper in diſeaſes of the lungs, in which reſpiration is affected. Of this number are ſulphur, lungwort, hyſſop, ground-ivy, and colt's-foot: they are uſed in phthiſes, aſthmas, peripneumonies, pluriſies, &c.

POA, meadow-graſs, in botany, a genus of plants, the corolla whereof is compoſed of two valves, of an ovato-acuminated figure; hollow, compreſſed, and ſomewhat longer than the cup, and without awns. It ſupplies the place of a pericarpium; and adheres every way to the ſeed, which is ſingle, of an oblong figure, compreſſed and pointed at each end.

This is the moſt common of all graſſes with us, and makes principally the green covering of moſt of our fields and meadows.

POCKET, in the woollen trade, a word uſed to denote a larger ſort of bag, in which wool is packed up to be ſent from one part of the kingdom to another. The pocket contains uſually twenty-five hundred weight of wool.

POCK-WOOD, *Guaicum*, in botany, ſee the article GUAICUM.

POD, *Siliqua*, among botaniſts, a kind of pericarpium, conſiſting of two valves, which open from the baſe to the point, and wherein the ſeeds are faſtened along both the ſurtures or joining of the valves, ſuch are the ſeed veſſels of the cabbage, turnep, radiſh, ſtock, &c.

PODAGRA, in medicine, the gout in the feet. See the article GOUT.

PODOMETER, or PEDOMETER, the ſame with perambulator. See the article PERAMBULATOR.

PODARIA, in zoology, a diviſion, order, or ſeries of wingleſs inſects, with ſhort bodies, and not very numerous legs; comprehending the puceron, pediculus, acarus, ſpider, ſquill, &c. See the article PUCERON.

PODOPHYLLUM, ducks-foot, in botany, a genus of plants, the flower of which conſiſts of nine orbiculated concave petals, plicated at their margin; the filaments are numerous, very ſhort, and topped with large oblong erect antheræ: the fruit is an ovate, unilocular berry, crowned with the ſtigma, and contains a number of roundiſh ſeeds.

POEM, Ποίημα, a compoſition in verſe of a due length and meaſure. See the articles VERSE and MEASURE.

Poems are generally denominated from the ſubject matter, as the apobaterion, epibaterion, epinicion, epithalamium, genethliac, elegiac, ſatiric, epitaph, panegyric, lyric, paſtoral, &c. and others, from the manner of narration, as epic, dramatic, &c. to which may be added odes, eclogues, and idylliums. To this head may alſo be referred ſeveral other compoſitions of a leſs ſerious kind, as the acroſtic, enigma, anagram, cento, echo, &c. See each under its proper head: APOBATERION, &c.

The Abbé Du Bos obſerves, in regard to poems, that ſome are intereſting in general, others in particular; that the beauties of execution alone do not conſtitute a good poem; that the defects of poems are leſs diſcernable than thoſe of a picture; that our diſlike falls only on the bad part of a poem; that every kind of poem has ſomething particular in its ſtyle; that by the beauty of the ſtyle we muſt judge of poems; that it muſt be a long time before the merit of a good poem is diſtinguiſhed; and finally, that the character of the poetic ſtyle has always decided the good or bad ſucceſs of poems, even of thoſe which by their length ſeem to have the greateſt dependance on the œconomy of the plan, on the diſtribution of the action, and on the decency of the manners.

POESY,

POESY, the ſame with poetry. See the article POETRY.

POET, ποιητης, the author of a poem. See the article POEM.

POETS ROSEMARY. See the article OSYRIS.

POETICAL, ſomething that relates to poetry or poets, in which ſenſe we ſay poetical genius, poetical licence, &c.

POETICAL JUSTICE, is chiefly uſed in reſpect of the drama, to denote a diſtribution of rewards and puniſhments to the ſeveral perſons at the cataſtrophe or cloſe of a piece, anſwerable to the ſeveral characters they appeared in.

POETICAL *riſing and ſetting of the Stars.* The three kinds of riſing and ſetting, viz. the coſmical, acronical, and helical, were made by the antient poets, referring the riſing, &c. of the ſtars to that of the ſun. See COSMICAL, &c.

POETICS, the doctrine of poetry, or the laws and rules of conducting pieces, or compoſitions of poetry, ſuch is Ariſtotle's Poetics, a work much valued.

POETRY, the art of compoſing poems, or pieces in verſe; or, as defined by Voſſius, the art of repreſenting actions in metre.

Voſſius thinks that love was the firſt occaſion of poetry, which is not improbable, conſidering that this affection is coeval with mankind, is univerſal, and naturally productive of poetry; yet it undoubtedly owes its increaſes and progreſs to religion: Dacier indeed calls it the offspring of religion; and it is certain, in the earlieſt ages of the world, that it was uſual to ſing hymns to the honour of the gods upon ſolemn feſtivals. Du Bos thinks that poetry has been employed in all ages, even by the moſt unpoliſhed nations, to preſerve the memory of paſt events. Its principal aim is to flatter our ſenſes and imagination: for, according to Plato, it awakens the ſpiritual empire of the ſoul. Every kind of poetry charms us in proportion to its object, ſays Du Bos; and to be very affecting, it ought to be very exact. It is not the ſame with poetry as with other arts, for an ignorant perſon may judge of poetry by the impreſſion it makes on him: whence all men have a right to give their opinion of a piece of poetry, and this judgment ought to be founded on experience rather than on argumentation. Poetry is an art where every thing ſhould pleaſe. It is not enough to exhibit nature, which in certain places and circumſtances is rude and unpleaſant, but the poet muſt chuſe in her what is beautiful from what is not: whence a poet ought to chuſe, for the ſubject of his imitation, ſomething that is naturally affecting. There is a particular rhetoric for poetry, which conſiſts in diſcerning very preciſely what ought to be ſaid figuratively, and what ought to be ſpoken ſimply; and in knowing where ornament is required, and where not: yet the ſtyle ſhould be copious, and every ſpecies of writing in this art ſhould have a diction proper to itſelf.

The qualifications then neceſſary for poetry, or thoſe which form a good poet, are ſeldom found united in one perſon: he muſt have an extraordinary genius, great natural gifts, a wit juſt, piercing, ſolid, and univerſal; an underſtanding clear and diſtinct; an imagination neat and pleaſant; an elevation of ſoul that depends not on art, or ſtudy, and which is purely a gift of heaven, and muſt be ſuſtained by a lively ſenſe and vivacity; a great judgment to conſider wiſely of things, and a vivacity to expreſs them with that grace and abundance which gives them beauty. In fine, to accompliſh a poet, is required a temperature of wit and fancy, of ſtrength and ſweetneſs, of penetration and delicacy; but, above all, he muſt have a ſovereign eloquence, and a profound capacity. Theſe are the qualities that muſt concur together to form the genius of a poet, and ſuſtain his character.

The rules of poetry and verſifying are taught by art, and acquired by ſtudy; but this force and elevation of thought, which Horace calls ſomething divine, and which alone makes the poetry of any value, muſt be derived from nature; or, according to Ariſtotle, from ſome happy tranſports, to which that author gives the name of madneſs. Hence the critics conclude, the end of poetry is to pleaſe; its cauſe, either the excellence of the poet's genius, or a poetical fury and tranſport of the ſoul, manageable by the judgment; its matter, long and ſhort ſyllables, and feet compoſed hereof, with words furniſhed by grammar; and its form, the arrangement of all theſe things in juſt and agreeable verſe, expreſſing the thoughts and ſentiments of the author after the manner already mentioned. But after all, how narrow are all theſe bounds, if we conſider poetry in the light wherein the works of Homer and Virgil have ſet it. This, which is therefore diſtinguiſhed by the name of the greater poetry, in contradiſtinction to the low and ſimple, or verſification, conſiſts principally in fiction, or the invention of fables, in the expreſſing of things by allegories, and metaphors, and in the inventing of actions, under which the truths which the poet has to teach, may be agreeably diſguiſed.

POINCIANA, Barbadoes flower-fence, in botany, a plant which riſes with a ſtrait ſtalk ten or twelve feet high, which is covered with a ſmooth grey bark, and dividing into ſeveral ſpreading branches at the top, which are armed at each joint with two ſtrong crooked ſpines, and are furniſhed with compound alated leaves, each being compoſed of ſix or eight pair of ſimple winged leaves, the lower pair being compoſed of four or five pair of lobes, the others gradually increaſing in their number toward the top, where they decreaſe, and become ſmaller; the lobes are about three quarters of an inch long, and almoſt half an inch broad at their points, leſſening gradually to their baſe: they are of a light green, and when bruiſed, emit a ſtrong

odour. The branches are terminated by looſe ſpikes of flowers, the footſtalk of each flower is near three inches long, the flower is compoſed of five unequal petals, four of which are roundiſh, and nearly equal; the fifth is larger, diſform and crenated; the ſtamina are ten long ſetaceous filaments, terminated by oblong incumbent antheræ. The fruit is an oblong compreſſed pod, about three inches long, divided into three or four cells by tranſverſe partitions, each containing one flattiſh irregular ſeed. The flowers are beautifully variegated with a deep red, or orange-colour, yellow and ſome ſpots of green.

This plant grows naturally in both Indies, and at Barbadoes it is planted in hedges; it is alſo called by ſome Spaniſh carnation, with us it is propagated by ſeeds, which ſhould be ſown in a hot bed, and when come up, tranſplanted ſingly into ſmall pots, and placed in the tan-bed in the hot-houſe, where they muſt continually remain, obſerving to water and ſhift them when neceſſary.

POINT, a term uſed in various arts.

POINT, *Punctum*, in geometry, as defined by Euclid, is a quantity which has no parts, or which is indiviſible. Points are the ends or extremities of lines. If a point be ſuppoſed to be moved any way, it will, by its motion, deſcribe a line.

POINT *of contrary Flexure*. See the article FLEXURE.

POINT, in phyſics, the leaſt ſenſible object of ſight, marked with a pen, point of a compaſs, or the like. Of ſuch points all phyſical magnitude conſiſts. This phyſical point is the ſame with what Mr. Locke calls the point ſenſible, and which he defines to be the leaſt particle of matter, or ſpace, we can diſcern. He adds, that to the ſharpeſt eye, this is ſeldom leſs than thirty ſeconds of a circle, whereof the eye is the center.

POINT, in grammar, a character uſed to mark the diviſions of diſcourſe. A point proper, is what we otherwiſe call a full ſtop or period.

POINT, in muſic, a mark or note antiently uſed to diſtinguiſh the tones or ſounds; hence we ſtill call it ſimple counter-point, when a note of the lower part anſwers exactly to that of an upper; and figurative counter-point, when any note is ſyncopated, and one of the parts makes ſeveral notes or inflections of the voice, while the other holds only one.

We ſtill uſe a point, to raiſe the value of a note, and prolong its time by one half, e. g. a point added to a ſemibreve inſtead of two minims, make it equal to three; and ſo of the other notes. See the article TIME.

POINT, in aſtronomy, a term applied to certain points or places, marked in the heavens, and diſtinguiſhed by proper epithets.

The four grand points or diviſions of the horizon, viz. the eaſt, weſt, north, and ſouth, are called the cardinal points. See the articles HORIZON, EAST, WEST, &c.

The zenith and nadir are the vertical points: the points wherein the orbits of the planets cut the plane of the ecliptic, are called the nodes: the points wherein the equator and the ecliptic interſect, are called the equinoctial points; particularly, that whence the ſun aſcends toward the north pole, is called the vernal point; and that by which he deſcends to the ſouth pole, the autumnal point. The points of the ecliptic, where the ſun's aſcent above the equator, and deſcent below it, terminate, are called the ſolſticial point; particularly the former of them, the eſtival or ſummer-point; the latter, the brumal or winter-point.

POINT *of the Horizon*, or *Compaſs*, in navigation and geography. See the articles HORIZON and COMPASS.

POINT, is alſo uſed for a cape or head-land, jetting out into the ſea: thus ſeamen ſay, two points of land are in one another, when they are ſo in a right-line againſt each other, as that the innermoſt is hindered from being ſeen by the outermoſt.

POINT, is alſo an iron or ſteel inſtrument, uſed with ſome variety in ſeveral arts.

Engravers, etchers, cutters in wood, &c. uſe points to trace their deſigns, on the copper, wood, ſtone, &c.

POINT, in the manufactories, is a general term, uſed for all kinds of laces, wrought with the needle; ſuch are the point de Venice, point de France, point de Genoa, &c. which are diſtinguiſhed by the particular œconomy and arrangement of their points.

POINT, in poetry, denotes a lively briſk turn or conceit, uſually found or expected at the cloſe of an epigram.

POINT-BLANK, in gunnery, denotes the ſhot of a gun levelled horizontally. See the article GUNNERY.

POINTED, in heraldry. A croſs pointed, is that which has the extremities turned off into points by ſtraight lines.

POINTING, in grammar, the art of dividing a diſcourſe, by points, into periods and members of periods, in order to ſhew the proper pauſes to be made in reading, and to facilitate the pronunciation and underſtanding thereof.

POINTING, in war, the levelling a cannon, or mortar, ſo as to play againſt any certain point.

POINTING, among ſeamen, marking on the chart in what part or place the veſſel is.

POINTING *the Cable*, in the ſea-language, is untwiſting it at the end, leſſening the yarn, twiſting it again, and making all faſt with a piece of marline, to keep it from ravelling out.

POISON, in medicine, a malignant quality in ſome animal, vegetable, or mineral body, which renders it hurtful, and even mortal to thoſe who take it.

To POISON *a Piece*, with gunners, is the ſame as to clog and nail it up.

POISON-TREE, *Toxicodendron*, in botany. See the article TOXICODENDRON.

POLAR, in general, ſomething relating to the poles of the world, or poles of the artificial globes: thus we meet with polar circles, polar dial, polar projection, &c.

POLARITY, the quality of a thing conſidered as having poles; but chiefly uſed in ſpeaking of the magnet.

POLE, πολος, in aſtronomy, one of the extremities of the axis, on which the ſphere revolves.

Theſe two points, each 90° diſtant from the equinoxial or equator, are, by way of eminence, called the poles of the world; and the extremities of the axes of the artificial globes, correſponding to theſe points in the heavens, are termed the poles thereof.

POLE, in ſpherics, a point equally diſtant from every part of the circumference of a great circle of the ſphere, as the center is in a plane figure; or it is a point 90° diſtant from the plane of a circle, and in a line, called the axis, paſſing perpendicularly through the center. The zenith and nadir are the poles of the horizon; and the poles of the equator are the ſame with thoſe of the ſphere.

POLES *of the Ecliptic*, are two points on the ſurface of the ſphere, 23° 30′ diſtant from the poles of the world, and 90° diſtant from every part of the ecliptic.

POLES, in magnetics, are two points of a load-ſtone, correſponding to the poles of the world; the one pointing to the north, the other to the ſouth. See the article MAGNET.

POLE, or *Vertex*, *of a Glaſs*, in optics, is the thickeſt part of a convex, or the thinneſt of a concave-glaſs.

If the glaſs be truly ground, the pole will be exactly in the middle of its ſurface.

POLE, or POLAR STAR, is a ſtar of the ſecond magnitude, the laſt in the tale of Urſa Minor.

POLE-CAT, *Putorius*. See the article PUTORIUS.

POLEMICAL, in matters of literature, an appellation given to books of controverſy, eſpecially thoſe in divinity.

POLEMONIUM, Greek-valerian, in botany, a plant, whoſe ſtalks riſe near a foot and a half high; they are hollow and channeled, and furniſhed with winged leaves, compoſed of ſeveral pair of folliculi, placed alternately from the extremities of the ſtalks; the flowers come out in bunches, and are of a beautiful blue colour, each is compoſed of a wheel-ſhaped petal, with a ſhort tube, and cut into five roundiſh ſegments at the extremity: they appear in May or June, and are ſucceeded by oval, acute pointed, three-cornered capſules, each having three cells, which are filled with irregular-pointed ſeeds. This plant is eaſily propagated by ſowing the ſeeds in the ſpring.

The leaves of this plant are accounted deterſive.

POLEMOSCOPE, in optics, a kind of reflecting perſpective-glaſs invented by Hevelius, who commends it as uſeful in ſieges, &c. for diſcovering what the enemy is doing, while the ſpectator lies hid behind an obſtacle.

POLIANTHES, the tuberoſe, in botany. See the article TUBEROSE.

POLICY, or POLITY, in matters of government. See the article POLITY.

POLICY, among letter-founders, denotes a certain proportion, obſerved among the letters that compoſe a fount; or a rule, whereby to regulate the number of each.

POLISHER, or BURNISHER, among mechanics, an inſtrument for poliſhing or burniſhing things proper to take a poliſh.

The guilders uſe an iron poliſher to prepare their metals before guilding, and the blood-ſtone to give them the bright poliſh after gilding.

POLISHING, in general, the operation of giving a gloſs or luſtre to certain ſubſtances, as metals, glaſs, marble, &c. See the articles METAL, GLASS, &c.

POLITICAL, in general, ſomething relating to policy or government.

POLITICS, the firſt part of œconomy, conſiſting in the well governing and regulating the affairs of a ſtate, for the maintenance of the public ſafety, order, tranquility, and morals.

POLITY, or POLICY, πολιτεια, denotes the peculiar form and conſtitution of the government of any ſtate or nation; or the laws, orders, and regulations relating thereto.

Polity differs only from politics, as the theory from the practice of any art. See the articles LAW, GOVERNMENT, &c.

Some divide polity into agoranomy, or the regulations relating to mercantile affairs; and aſtynomy, or thoſe which concern the judiciary government of the citizens: ſome add other branches, viz. thoſe relating to eccleſiaſtical and military affairs.

POLL, a word uſed in ancient writings for the head: hence to poll, is either to vote or to enter down the names of thoſe perſons who give in their votes at an election.

POLL-MONEY, a capitation or tax, impoſed by the authority of parliament on the head or perſon, either of all indifferently, or according to ſome known mark of diſtinction.

POLLARD, among hunters, a ſtag which has caſt his horns.

POLLARD, or POLLENGER, in agriculture, ſignifies a tree that has been frequently polled, or lopped.

POLLEN, among botaniſts, the ſame as farina. See the article FARINA.

POLLEX, in anatomy, denotes either the thumb or great toe, according as either manus or pedis is added to it.

POLLUTION, in general, ſignifies defilement, or the rendering a perſon, or place, unclean or unholy.

POLLUTION, in medicine, a diſeaſe which conſiſts in an involuntary emiſſion of the ſeed in the time of ſleep.

POLLUX, in aſtronomy, a fixed ſtar of the ſecond magnitude in the conſtellation Gemini, or the twins.

The ſame name is alſo given to the hindermoſt twin, or poſterior part of the ſame conſtellation.

POLVERINE, in commerce, the aſhes of the herb kali, preſerved for the uſe of making glaſs.

POLIACANTHA, in botany, the ſame with the carduus, or thiſtle; which ſee.

POLYADELPHIA, the name of the eighteenth claſs in the Linnæan Syſtem of Botany, and conſiſts of ſuch plants whoſe flowers are hermaphrodite, and furniſhed with ſeveral ſets of united ſtamina in each.

Of this claſs is the citron, orange, lemon, St. John's-wort, &c.

POLYANDRIA, the name of the thirteenth claſs of plants in the Linnæan Syſtem of Botany; comprehending ſuch plants whoſe flowers are hermaphrodite, and furniſhed with many ſtamina, or male parts, in each; theſe always exceed the number of twenty, and are inſerted in the receptacle.

To this claſs belong the piony, larkſpur, aconite, columbine, helebore, with ſeveral other genera; the fruits of ſome of them are of a poiſonous quality.

POLIANTHUS, in botany, a beautiful garden flower of the primroſe kind; the varieties of this is innumerable, being produced from ſeeds, which ſhould be ſown in February, either in borders, boxes, or pots, and ſhould have an eaſt aſpect, ſo as to be ſhaded from the heat of the day; in May they will be fit to be planted out for good, which ſhould be in a ſhady border of ſtrong rich earth, at about ſix inches aſunder, and the ſucceeding ſpring they will ſhew their bloſſoms, when their goodneſs may be judged of.

As the properties of a good polyanthus are ſimilar to thoſe of the auricula, we, therefore, to prevent repetition, refer the reader to the article AURICULA, where they are fully explained.

POLYCARPON, in botany, a genus of plants, whoſe flower conſiſts of five oblong, emarginated, very ſhort petals, with three ſlender filaments topped with roundiſh antheræ; the fruit is an ovate unilocular capſule, opening with three valves, and contains a number of oval ſeeds.

POLYCHREST, in pharmacy, a medicine that ſerves for many uſes, or that cures many diſeaſes.

Sal POLYCHREST, a compound ſalt, made of equal parts of ſalt-petre and ſulphur, laid on a red hot crucible.

POLYCNEMUM, in botany, a genus of plants, whoſe flower hath no corolla; the cup is formed of five erect, lanceolated, pointed leaves, with three capillary filaments, topped with obtuſe antheræ: the ſeed, which ſucceeds the flower, has ſcarce any covering, or at moſt only a very thin membrane.

POLYGALA, milk-wort, in botany, a genus of plants, producing papilionaceous flowers; the fruit is a turbinated heartſhaped capſule, with two cells and two valves, each containing an ovate ſeed.

The polygala-vulgaris grows naturally in many parts of England; it hath a perennial woody root, with three or four trailing herbaceous ſtalks, furniſhed with linear ſpear-ſhaped leaves; the flowers are produced at the top of the ſtalks, and are of a blue, purple, or white colour.

It is ſuppoſed, that cattle which feed on this plant, give a greater quantity of milk than uſual; and therefore it is reckoned good for nurſes for the ſame purpoſe.

POLYGALA VIRGINIANA, rattle-ſnake-root, is a ſpecies of the former; it grows naturally in many parts of North-America. The root of this plant is perennial, and compoſed of ſeveral fleſhy fibres, variouſly bent or contorted; it is yelloviſh without, but white within, and has an acrid bitteriſh taſte, but ſomewhat aromatic: from the root ariſes three or four branching ſtalks, which grow erect, upwards of a foot high, and furniſhed with oblong, ſpear-ſhaped leaves, placed alternately; the flowers are produced in looſe ſpikes at the ends of the branches, theſe are ſmall and of a white colour.

The root of this ſpecies is looked upon, in America, as a ſpecific againſt the bite of the rattle-ſnake, and has been long uſed by the Senega Indians for that purpoſe, which, if taken in time, is an infallible remedy: the Indians, when they travel in the woods, carry about them this root in powder, leſt they ſhould be bit by the rattle-ſnake, and whenever this happens, they take a quantity of the powder inwardly, and apply ſome of it to the part bitten, which is a certain cure, and of late years it hath been uſed by the inhabitants of Virginia in many diſorders, which are occaſioned by a thick ſizy blood; ſo that the root of this plant, when its virtues are fully known, may become one of the moſt uſeful medicines yet diſcovered.

POLIGAMIA, in botany, the name of the twenty-third claſs of plants in the Linnæan Syſtem; comprehending thoſe which produce (either upon the ſame or different plants) hermaphrodite flowers, and alſo flowers of one ſex only, be it male or female, or flowers of each ſex.

Of this claſs there are three orders or ſubdiviſions, whereof the firſt conſiſts of ſuch polygamious plants, as contain the different kinds of flowers on different parts of the ſame plant, and hence called polygamia-monoetia; ſuch are the plantain-tree, white-hele-

bore,

bore, maple, orach, &c. the ſecond order comprehends ſuch polygamious plants as have their different flowers not on the ſame individual plant, but on diſtinct ones of the ſame ſpecies, and hence called polygamia dioecia; of this order are the aſh, amber tree, ginſeng, &c. The third order, called polygamia-trioecia, comprehends ſuch plants as have the polygamy on three diſtinct plants; this order contains but one genus, which is the fig-tree.

POLYGAMY, a plurality of wives or huſbands, in the poſſeſſion of one man or woman, at the ſame time.

POLYGLOTT, πολυγλοτ῀ος, among divines and critics, chiefly denotes a bible printed in ſeveral languages. In theſe editions of the holy ſcriptures, the text in each language is ranged in oppoſite columns. The firſt polyglott Bible, was that of cardinal Ximenes, printed in 1517, which contains the Hebrew text, the Chaldee paraphraſe on the Pentateuch, the Greek verſion of the LXX. and the antient Latin verſion. After this, there were many others, as the Bible of Juſtiniani, biſhop of Nebio, in Hebrew, Chaldee, Greek, Latin, and Arabic; the Pſalter by John Potken, in Hebrew, Greek, Ethiopic, and Latin; Plantin's polyglott Bible, in Hebrew, Chaldee, Greek, and Latin, with the Syriac verſion of the New Teſtament; M. le Jay's Bible, in Hebrew, Samaritan, Chaldee, Greek, Syriac, Latin, and Arabic; Walton's polyglott, which is a new edition of Le Jay's polyglott, more correct, extenſive, and perfect, with ſeveral new oriental verſions, and a large collection of various readings, &c.

POLYGON, in geometry, a figure with many ſides, or whoſe perimeter conſiſts of more than four ſides at leaſt: ſuch are the pentagon, hexagon, heptagon, &c. See the articles PENTAGON, HEXAGON, &c.

POLYGON, in fortification, denotes the figure of a town, or other fortreſs.

The exterior or external polygon, is bounded by lines drawn from the point of each baſtion, to the points of the adjacent baſtions.

And the interior polygon, is formed by lines joining the centers of the baſtions.

Line of POLYGONS, on the French ſectors, is a line containing the homologous ſides of the firſt nine regular polygons inſcribed in the ſame circle; that is, from an equilateral triangle, to a dodecagon.

POLYGONAL NUMBERS, are ſo called, becauſe the units whereof they conſiſt may be diſpoſed in ſuch a manner, as to repreſent ſeveral regular polygons. See NUMBER.

The ſide of a polygonal number, is the number of terms of the arithmetical progreſſion that compoſe it; and the number of angles is that which ſhews how many angles that figure has, whence the polygonal number takes its name.

POLYGONATUM, Solomon's ſeal, in botany, is ranked by Linnæus among the convallaria. See the article CONVALLARIA.

The root of this plant is a famous vulnerary; for being applied in form of a poultice, it not only heals freſh wounds, but takes away the marks of bruiſes, &c.

POLYGONUM, knot-graſs, in botany, a genus of plants, whoſe flower is apetalous, but the cup is of a turbinated form, coloured withinſide, and divided into five oval ſegments at the limb; there is no pericarpium, but the ſeed, which is ſingle, three-cornered, and pointed, is contained in the cup.

To this genus Linnæus has joined the biſtorta, perſecaria, and fagopyrum of Tournefort. An infuſion of the common knot graſs is a valuable aſtringent medicine in hæmorrhages of all kinds.

POLYGYNIA, amongſt botaniſts, an order or ſubdiviſion of a claſs of plants in the Linnæan ſyſtem, comprehending ſuch plants of that claſs as have a great number of piſtils, or female organs of generation. ſee the articles PISTIL and GENERATION.

POLYHEDRON, in geometry, denotes a body or ſolid comprehended under many ſides or planes.

A gnomonic polyhedron is a ſtone with ſeveral faces, wherein are deſcribed various kinds of dials. See the article DIAL.

POLYHEDRON, polyſcope, in optics, is a multiplying-glaſs, or lens, conſiſting of ſeveral plane ſurfaces diſpoſed into a convex form. See the article LENS.

POLYHISTOR, a perſon of great and various erudition; whence

POLYMATHY, πολυμαθια, denotes the knowledge of many arts and ſciences.

POLYMNIA, in botany, a genus of plants, producing compound radiated flowers; the hermaphrodite florets which form the diſc are numerous, funnel-ſhaped, and quinquifid; the female florets compoſe the rays, and are ligulated and tridentated; the florets of the diſc are abortive, but the female ones produce ſolitary, ovate, gibbous, and naked ſeeds, placed on a paleaceous, convex, imbricated receptacle.

POLYMYTHY, πολυμυθια, in poetry, a fault in an epic poem, when inſtead of a ſingle mythos, or fable, there is a multiplicity of them.

POLYNOMIAL, or MULTINOMIAL, in algebra. See the article MULTINOMIAL.

POLYOPTRUM, in optics, a glaſs through which objects appear multiplied, but diminiſhed.

POLYPE, or POLYPUS, in zoology, a ſmall freſh-water inſect of a cylindric figure, but variable, with very long tentacula.

There-

There is ſcarce an animal in the world more difficult to deſcribe than this ſurpriſing inſect; it varies its whole figure at pleaſure, and is frequently found beſet with young in ſuch a manner, as to appear ramoſe and divaricated; theſe young ones adhering to it in ſuch a manner as to appear parts of its body.

When ſimple and in a moderate ſtate as to contraction or dilatation, it is oblong, ſlender, pellucid, and of a pale reddiſh colour: its body is ſomewhat ſmaller towards the tail, by which it affixes itſelf to ſome ſolid body; and larger toward the other extremity, where it has a large opening, which is the mouth, around which are the tentacula, which are eight in number, and one uſually extended to about half the length of its body. By means of its tentacula, or arms, as they are commonly called, expanded into a circle of more than half a foot diameter, the creature feels every thing that can ſerve it for food; and ſeizing the prey with one of them, calls in the aſſiſtance of the others, if neceſſary, to conduct it to its mouth.

The production of its young is different from the common courſe of nature in other animals; for the young one iſſues from the ſide of its parent in the form of a ſmall pimple, which lengthening every hour, becomes, in about two days, a perfect animal, and drops from off its parent to ſhift for itſelf: but before it does this, it has often another growing from its ſide; and ſometimes a third from it, even before the firſt is ſeparated from its parent; and what is very extraordinary is, that there has never yet been diſcovered among them any diſtinction of ſex, or appearance of copulation; every individual of the whole ſpecies being prolific, and that as much if kept ſeparate, as if ſuffered to live among others: but what is ſtill even more ſurpriſing, is the reproduction of its ſeveral parts when cut off; for when cut into a number of ſeparate pieces, it becomes in a day or two ſo many diſtinct and ſeparate animals; each having the property of producing a head and tail, and the other organs neceſſary for life, and all the animal functions. There are ſeveral other ſpecies of this animal, moſt of which are found in our ditches. See plate LXXIII. where fig. 11. repreſents a cluſter-polype, extending itſelf; and fig. 12. is the ſame polype after being ſoaked in water, and the tentacula, or branches laid ſtraight.

POLYPETALOUS, among botaniſts, an epithet applied to ſuch flowers as conſiſt of ſeveral petals, or flower-leaves. See the article FLOWERS.

POLYPODIUM, polypody, in botany, a genus of cryptogamious plants of the fern kind, the fructifications of which are diſtributed in round ſpots on the under ſurface of the leaf.

The polypodies are not branched, but conſiſt of ſingle leaves, divided almoſt to the middle-rib into oblong jaggs, or ſegments. Both the root and leaves are uſed in medicine, being a gentle cathartic, and recommended in obſtructions of the viſcera.

POLYPREMUM, in botany, a genus of plants, whoſe flower is monopetalous and rotated, with the limb cut into five ſegments; the ſtamina are four very ſhort filaments, topped with roundiſh antheræ. The fruit is an ovate emaginated capſule, compreſſed at the top, containing two valves and two cells, which incloſe a great number of ſeeds.

POLYPUS, or POLYPUS *of the Heart*, in medicine, a maſs compoſed of various pellicles and fibres generated in the heart and large veſſels.

POLYPUSES *of the Lungs*, are viſcous excretions of the ſmall glands, formed in the deeper branches of the aſpera arteria, and frequently miſtaken for pieces of the blood-veſſels or lungs.

POLYPUS *of the Noſe*, a fleſhy excreſcence, in the inſide of the noſtrils, which is of various ſizes, and of different conſiſtencies; ſometimes theſe excreſcences are ſoft, ſometimes they are capable of elongation, and at other times they turn hard and rigid.

POLYPYRENEOUS, an appellation given to fruits, containing ſeveral kernels, or ſeeds.

POLYSCOPE, in optics, the ſame with polyhedron. See POLYHEDRON.

POLYSPASTON, in mechanics, a machine conſiſting of an aſſembage of ſeveral pullies; for the nature and force of which, ſee the article PULLEY.

POLYSPERMOUS, among botaniſts, ſuch plants as have more ſeeds than four ſucceeding each flower, without any certain order.

POLYSYLLABLE, in grammar, a word conſiſting of more ſyllables than three; for when a word conſiſts of one, two, or three ſyllables, it is called a monoſyllable, diſſyllable, and triſyllable.

POLYSYNDETON, in grammar and rhetoric, a figure whereby a redundance of conjunctions, eſpecially copulative ones, is uſed.

POLYTHEISM, in matters of religion, the doctrine or belief of a plurality of gods.

POLYTRICHUM, in botany, a genus of moſſes, producing ſeparate pedicles ſupporting male and female parts; the pedicles always growing out of the extremities of the ſtalks; the calyptra is conic, equal, and ſometimes hairy; the antheræ is oblong; and in the female part the cup is coloured, and contains a ſlender jointed piſtil.

POMATUM, an ointment made thus: Take of freſh hog's lard, and beat it into cream with roſe-water, and ſcent it with oil of lemons, thyme, or the like. Pomatums are alſo occaſionally perfumed with the odours of jeſſamines, oranges, jonquils, tuberoſes, &c. They are principally uſed for pimples, and foulneſſes of the ſkin.

POMEGRANATE-TREE, *Punica*, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh, erect, patent petals, inſerted in the cup, which

which alſo contains a great number of capillary filaments topped with oblong antheræ. The fruit is a large globoſe apple, crowned with the cup, and formed into nine cells: the ſeeds are numerous, roundiſh, and ſucculent; the receptacle is membranaceous, and divides every cell into two parts.

There are ſeveral varieties of pomegranate trees, which grow naturally in Spain, Portugal, Italy, &c. as alſo in the Weſt-Indies: theſe plants are cultivated in England more for the beauty of their fine ſcarlet flowers than their fruit, which rarely comes to perfection with us; they are eaſily propagated by laying down their branches in the ſpring, which in one year's time will take good root, and may then be tranſplanted where they are deſigned to remain; the beſt ſeaſon to move them is juſt before they begin to ſhoot; the flowers always proceed from the extremity of the branches, which are produced the ſame year; for which reaſon all the weak branches of the former year ſhould be cut out, and the larger lengthened according to their ſtrength; the time for this operation is the beginning of October. The moſt admired ſort is that which produces double flowers, the cup of which is the balauſtine of the ſhops. Pomegranates are of various ſizes, ſome being as big as large apples; the rind is pretty thick, hard and brittle; before it is ripe it is green and ſmooth, but afterward reddiſh and wrinkled, and laſt of all it becomes of a bay colour and yellowiſh within, and has an aſtringent taſte; the pulp has a ſweetiſh vinous flavour, though it is ſometimes acid. This fruit differs but little in its medicinal virtues from quinces; the juice is good for weakneſſes of the ſtomach and bowels, and removes nauſeas, vomitings, and fluxes; it is reckoned alſo a good cooler in inflammatory fevers: the rind of this tree, called malicorium, is more aſtringent than the juice, and has a bitteriſh auſtere taſte; it is therefore much ordered in decoctions againſt gonorrhæs and fluxes, and often in aſtringent clyſters. It will ſupply the place of oak bark for tanning leather, as well as of galls for making ink.

POMES, in heraldry, are green roundles, ſo called by the Engliſh heralds, who give diſtinct names to the different coloured roundles.

POMIFEROUS, in botany, an appellation given to apple-bearing trees. See the article APPLE.

POMMÉ, or POMMETTÉ, in heraldry, is a croſs with one or more balls or knobs at each of the ends.

POMMEL, or PUMMEL, in the manege, a piece of braſs, or other matter, at the top and in the middle of the ſaddle-bow.

POMMEL, is alſo a round ball of ſilver, ſteel, or the like, fixed at the end of the guard, or graſp of a ſword, to ſerve, in ſome meaſure, as a counterpoiſe.

POMPHOLYX, in the materia medica, a ſemimetallic recriment, very nearly allied in its nature to tutty; being a kind of flowers of zinc or calamine, ſublimed higher than tutty, and carrying leſs of any metalline particles with it.

POMPION, in botany. See CUCURBITA.

POMUM, apple. See APPLE.

POMUM, among botaniſts, is alſo underſtood to be a fleſhy or pulpy pericarpium, without a valve, and containing a capſule; therefore, by Linnæus, the fruit of the melon, cucumber, gourd, momordica, &c. is called pomum.

POND-WEED, *Potamogeton*, in botany. See the article POTAMOGETON.

PONE, in law, a writ whereby a cauſe depending in an inferior court, is removed into the king's-bench, or common-pleas.

PONIARD, a little pointed dagger, very ſharp edged: it is now little uſed, except among aſſaſſins.

PONS VAROLI, in anatomy, the upper part of a duct in the third ventricle of the brain. See the article BRAIN.

PONTEDERIA, in botany, a genus of plants, whoſe flower conſiſts of ſix petals, which are divided, and form a kind of lip; the three upper ones are erect, and the three under reflexed; the filaments are ſix, and inſerted in the corolla, and terminated with oblong antheræ. The fruit is a conic fleſhy capſule, of a triangular figure, containing three cells, which are filled with roundiſh ſeeds.

PONTIFEX, PONTIF, or high prieſt, a perſon who has the ſuperintendance and direction of divine worſhip, as the offering of ſacrifices, and other religious ceremonies.

PONTIFICATE, is uſed for the ſtate or dignity of a pontiff, or high prieſt; but more particularly, in modern writers, for the reign of a pope.

PONTON, or PONTOON, in war, denotes a little floating bridge made of boats and planks. The late invented ponton is of copper furniſhed with an anchor, &c. to fix it. To make a bridge, ſeveral of theſe are diſpoſed two yards aſunder, with beams acroſs them; and over thoſe are put boards or planks. They are alſo linked to each other, and faſtened on each ſide the river by a rope run through a ring in each of their heads, and fixed to a tree or ſtake on either ſhore: the whole makes one firm uniform bridge, over which a train of artillery may paſs.

PONT VOLANT, flying bridge. See the article BRIDGE.

POOL, is properly a reſervoir of water ſupplied with ſprings, and diſcharging the overplus by ſluices, defenders, weirs, and other cauſeways.

Mill-POOL, a ſtock of water by whoſe force, &c. the motion of a mill is effected. See the article MILL.

POOP, *Puppis*, the ſtern of a ſhip, or the higheſt, uppermoſt, and hinder part of the ſhip's hull. See the articles STERN and SHIP.

POOR, in law, an appellation given to all perſons

ſons who are in ſo low and mean a condition, as that they either are, or may become, a burden to a pariſh.

Hence under the term poor, may be included thoſe who are ſo through impotency; as the aged, the blind, the lame, the fatherleſs and motherleſs, perſons labouring under ſickneſs, or who are idiots, lunatics, &c. for all whom the overſeers of the poor are obliged to provide.

There is alſo another kind of poor, on account of caſualties and misfortunes; as decayed houſe-keepers, and thoſe who have been ruined either by fire, water, robbery, or loſſes in trade, &c. all of whom, being able, are to be ſet to work, and otherwiſe relieved by the pariſh; and it is the ſame with reſpect to poor perſons overcharged with children, diſabled labourers, &c.

Before the reign of queen Elizabeth, we had few or no laws for the relief of the poor of this kingdom; but then a ſtatute was made enacting, that the church-wardens of every pariſh, and two or more houſholders, are to be nominated and appointed yearly in Eaſter week, by two juſtices of the peace, as overſeers of the poor; which ſaid overſeers ſhall meet once a month at the pariſh church, there to conſider of proper ways to relieve the poor, &c. And with the aſſiſtance of the juſtices, they may make a rate on every inhabitant of the pariſh, and occupier of lands, houſes, tithes; as alſo perſonal eſtate, to raiſe a ſtock for imploying of the poor, relieving the impotent, and others not able to work, the placing poor children out apprentices, and erecting cottages for poor perſons, &c.

POPE, *Papa*, the ſovereign pontiff, or ſupreme head of the Romiſh church. The appellation of pope was antiently given to all Chriſtian biſhops, but about the latter end of the eleventh century, in the pontificate of Gregory VII. it was uſurped by the biſhop of Rome, whoſe peculiar title it has ever ſince continued.

POPLAR, *Populus*, in botany, a genus of trees producing male and female flowers on ſeparate plants, growing in an oblong amentum, looſely imbricated, and compoſed of ſcales which are oblong, plain, and cut at their margin; the corolla has no petals, but conſiſts of a monophyllous nectarium, turbinated at bottom, and tubulated at top; the ſtamina are eight very ſhort filaments, topped with large, tetragonal antheræ. The fruit is an ovate bilocular capſule, containing a number of oval ſeeds covered with a hairy down. There are different ſpecies of this genus, as the white poplar or abele tree, the black poplar, the aſpen tree, the Carolina poplar, &c. They are propagated either by layers, or large cuttings, planted in February, in a moiſt ſoil, where they will readily take root.

The beſt uſe theſe trees can be applied to, is for breaking off the weſterly or northerly winds, and to be planted in ſuch land where ſcarce any other tree will thrive, for the advantage as will ariſe from its timber; for the wood of theſe trees, eſpecially of the abele, is very good to lay for floors, where it will laſt many years; and for its exceeding whiteneſs, is by many perſons preferred to oak; but being of a ſoft contecture, is very ſubject to take the impreſſion of any thing hard and pointed, which renders it leſs proper for this purpoſe: it is alſo very proper for wainſcotting rooms, being leſs ſubject to ſwell or ſhrink than moſt other ſorts of wood; but for turnery ware there is no wood equal to this, for its exceeding whiteneſs; ſo that trays, bowls, and many other utenſils, are made of it: and the bellows-makers prefer it for their uſe; as do alſo the ſhoe-makers, for heels for womens ſhoes; and of this wood the ſhoes are made which are worn by the peaſants in France; it is alſo very good to make light carts; and the poles are very proper to ſupport vines, hops, &c. and the loppings will afford good fuel.

POPLES, in anatomy, the inner part of a juncture, whereby the thigh bone is articulated with the tibia.

POPLITEA, in anatomy, a name given to the third vein of the leg, ariſing from the heel, where it is formed out of ſeveral branches, coming both from the heel and ancle. It lies pretty deep in the fleſh, and aſcending up to the ham, terminates in the crural vein.

POPPY, *Papaver*, in botany, a genus of plants, whoſe flower conſiſts of four roundiſh, plane, patent petals, narroweſt at the baſe, and alternately ſmaller; the filaments are numerous, capillary, and topped with oblong, compreſſed, erect antheræ. The fruit is a large capſule, crowned by a plain ſtigma, and opening in many holes under it: the ſeeds are numerous and very ſmall, and the receptacles are longitudinal plicæ, of the ſame number with the rays of the ſtigmata, and growing to the ſides of the capſule.

Of poppies there are ſeveral ſpecies; thoſe cultivated in gardens are double and extremely beautiful, vieing with the fineſt carnations for ſtripes and colours, and have nothing to diſcountenance their having a place amongſt the moſt brilliant collection, but their ſhort duration and offenſive ſmell. They are propagated by ſowing the ſeeds in autumn, or early in the ſpring, in the places where they are intended to flower. The heads of the fruit of poppies contain a milky juice, which may be collected in a conſiderable quantity, by ſlightly wounding them when almoſt ripe; this expoſed for a few days to the air, thickens into a clammy maſs, the ſame as opium, which is an extract from the heads of the white or Turky poppy. See the article OPIUM. The ſeeds of the white poppy are uſed in emulſions, being cooling, and good in fevers and inflammatory diſtempers, as alſo for the ſtranguary and heat of urine.

Prickly

Prickly POPPY. See ARGEMONE.

Spatling POPPY. See CUCUBALUS.

POPULAGO, in botany, Tournefort's name for the caltha. See CALTHA.

POPULAR, *Popularis*, ſomething that relates to the common people.

POPULUS, the poplar tree. See the article POPLAR.

PORCELAIN, or PURCELAIN, a fine ſort of earthen-ware, chiefly manufactured in China, and thence called china-ware. See the article CHINA-WARE.

PORCELAIN-SHELL, *Porcellana*, in natural hiſtory, a genus of ſhell-fiſh, with a ſimple ſhell without any hinge, formed of one piece, and of a gibboſe figure on the back; the mouth is long, narrow and dentated on each ſide; and the animal inhabiting it is a limax.

PORCH, in architecture, a kind of veſtible ſupported by columns; much uſed at the entrance of the antient temples, halls, churches, &c.

PORCUPINE, *Hiſtrix*, in zoology, a very ſingular genus of quadrupeds, belonging to the order of the glires.

The fore-teeth of the porcupine are obliquely truncated, and it has no canine teeth: its ears are of a figure approaching to round, and the body is covered with prickles, or ſpines, and alſo with briſtles, like thoſe of a hog. The ſpines or quills, as they are commonly called, are of two kinds; ſome being ſhorter, thicker, ſtronger, and more ſharp-pointed; and others longer, weaker, and more flexible: theſe laſt are a foot long, and compreſſed at the point. The ſpines of the firſt kind are white at the baſe, and of a duſky cheſnut-colour on the upper part; and the latter kind are white at each extremity, and variegated with black and white in the middle. This terrible covering makes the creature appear much larger than it really is: it ſomewhat reſembles the badger in ſhape; and its length, from the noſe to the tail, is about two feet.

PORE, in anatomy, a little interſtice or ſpace between the parts of the ſkin, ſerving for perſpiration. See the articles CUTIS and PERSPIRATION.

PORELLA, in botany, a genus of moſſes, the anthera of which is oblong, and opening in holes on many ſides; the other parts are too minute to be deſcribed.

POROPHYLLUM, in botany, the ſame with the cacalia of Linnæus. See the article CACALIA.

PORPESSE, in ichthyology, a ſpecies of the delphinus, with a coniform body, a broad back, and a ſubacute roſtrum: it is a very large fiſh, frequently confounded with the dolphin, from which it is different.

PORPHYRY, in natural hiſtory, a kind of ſtone of a plain uniform maſs, ſpotted with ſeparate concretions, of great hardneſs, giving fire with ſteel, not fermenting with acids, and very ſlowly and difficultly calcining in a ſtrong fire.

PORRUM, the leek, in botany, a well known ſpecies of the cepa, or onion, with which it agrees both in botanical characters and medicinal virtues, being only accounted weaker. See the article ONION.

PORT, a commodious place ſituated on the ſea-coaſt, or at the mouth of a river, ſcreened from the wind and the enterprizes of an enemy, with depth of water ſufficient for ſhips of burden, and where veſſels lie by to load and unload.

Ports are either natural or artificial; the natural are thoſe formed by providence, and the artificial ſuch as are formed with moles running into the ſea.

Free-PORT, in commerce, a port in which merchants of all nations may load and unload their veſſels, without paying any duties or cuſtoms; as thoſe of Leghorn, Genoa, &c.

PORT, among ſailors, denotes the larboard, or left ſide of the ſhip: thus to port a helm, is to put it on the left ſide of the ſhip, that the ſhip may go to the right.

PORT-CRAYON, a pencil-caſe, which is uſually four or five inches long, and contrived ſo as that the pencil may ſlide up and down. Its inſide is round, and its outſide is ſometimes filed into eight ſides or faces, on which are drawn the ſector lines: ſometimes it is made round both without-ſide and within, and has its length divided into inches and parts of inches.

PORT-GREVE, or PORT-GRAVE, was formerly the principal magiſtrate of maritime towns. The chief magiſtrate of London was antiently called by this name, till Richard I. cauſed the city to be governed by two bailiffs; ſoon after which, king John granted the city a mayor.

PORT-HOLES, in a ſhip, are the holes in the ſide of the veſſel, through which are put the muzzles of the great guns. Theſe are ſhut up in ſtorms, to prevent the water from driving through them. The Engliſh, Dutch, and French ſhips, have the valves, or caſements, faſtened at the top of the port-holes, and the Spaniſh veſſels aſide of them.

PORT-LAST, the ſame with the gun-wale of a ſhip. See GUN-WALE.

The yard is down a-port-laſt, when it lies down on the deck.

PORT-ROYAL, the name of two monaſteries of Ciſtercian nuns, in the dioceſe of Paris; the one near Chevreuſe, at the diſtance of five leagues from Paris, called Port-Royal of the Fields, and the other in Paris, in the ſuburbs of St. James.

PORT-VENT, in an organ, is a wooden pipe which ſerves to convey the wind from the bellows to the ſound-board. See the article ORGAN.

PORTA, or VENA-PORTA, in anatomy, one of the three primary veins of the human body.

PORTAIL, in architecture, the frontiſpiece of a church, viewed on the ſide on which is the great door.

Portail is alſo uſed for the great door of a palace, caſtle, &c.

PORTAL, in architecture, a little gate where there are two gates of a different bigneſs; alſo a little ſquare corner of a room cut off from the reſt by the wainſcot, and forming a ſhort paſſage into the room.

The ſame name is alſo ſometimes given to a kind of arch of joiners work before a door.

PORTERAGE, a duty paid at the cuſtom-houſe to thoſe who attend at the water-ſide, and belong to the package-office.

There are tables hung up aſcertaining the porterage for landing and ſhipping goods.

PORTICO, in architecture, a kind of gallery on the ground, ſupported by columns, where people walk under covert.

Though this word is derived from *porta*, a gate, or door, yet it is uſed for any diſpoſition of columns which form a gallery.

PORTIO, portion, a part or diviſion of any thing: thus portio dura, and portio mollis, in anatomy, is a portion of the ſeventh pair of nerves of the brain.

PORTION, in law, a part or proportion, either of money given with a daughter, or of an inheritance.

PORTION, in the canon-law, is that proportion or allowance which a vicar receives out of a rectory or impropriation.

PORTIONER, is where a parſonage is ſerved by two or more clergymen alternately, in which caſe the miniſters are called portioners, becauſe they have only their proportion of the tythes or profits of the living.

PORTLAND-STONE, is a dull whitiſh ſpecies of pſadurium, much uſed in buildings about London: it is compoſed of a courſe grit, cemented together by an earthy ſpar; it will not ſtrike fire with ſteel, but makes a violent effervescence with aqua-fortis.

PORTLANDIA, in botany, a genus of plants, whoſe flower is monopetalous; the tube is long and ventricoſely funnel ſhaped, and the border is ſhorter than the tube, and cut into five acute ſegments: the ſtamina are five ſubulated filaments, topped with linear erect antheræ: the fruit is an oval bilocular capſule, having five furrows and five angles, and contains a number of imbricated compreſſed roundiſh ſeeds.

PORTMANTEAU, a cloak-bag of cloth, leather, &c. in which the cloak, linen, and other habiliments of travellers are diſpoſed and laid on the horſe's crupper.

PORTRAIT, POURTRAIT, or POURTRAITURE, in painting, the repreſentation of a perſon, and eſpecially of a face done from the life.

PORTULACA, purſlane, in botany, a genus of plants, whoſe flower conſiſts of five plane, erect, obtuſe petals, larger than the cup, with many hairy ſtamina: the fruit is an ovate covered capſule, with one cell, containing many ſmall ſeeds.

The common garden purſlane is propagated by ſowing the ſeeds in any of the ſummer months; and where it is ſuffered to ſhed, it will naturally come up the ſucceeding ſummer. It is cultivated for culinary purpoſes, and is reckoned a great aſſuager of choleric heat; it is alſo accounted good in the ſcurvy, and all cutaneous eruptions.

PORUS, in general, denotes a pore. See the article PORE.

PORUS BILARIUS, according to ſome, is the ſame with the hepatic duct; but others make a diſtinction between them, and obſerve, that the ductus hepaticus runs from the liver to the ductus choledocus; and that the branches of this, diſtributed through the whole liver, make what are called the pori biliarii.

POSE', in heraldry, denotes a lion, horſe, or other animal, ſtanding ſtill, with all his four feet on the ground.

POSITION, or SITUATION, in phyſics, an affection of place, which expreſſes the manner of any body's being therein.

POSITION, or *the Rule of Falſe* POSITION, otherwiſe called *the Rule of* FALSHOOD, in arithmetic, is a rule, ſo called, becauſe in calculating on ſeveral falſe numbers taken at random, as if they were the true ones, and from the differences found therein, the numbers ſought is determined. This rule is either ſingle or double.

Single poſition, is when there happens in the propoſition ſome partition of numbers into parts proportional, in which caſe the queſtion may be reſolved at one operation, by this rule. Imagine a number at pleaſure, and work therewith according to the tenor of the queſtion, as if it were the true number; and what proportion there is between the falſe concluſion and the falſe proportion, ſuch proportion the given number has to the number ſought. See the article PROPORTION.

Therefore, the number found by argumentation, ſhall be the firſt term of the Rule of Three; the ſecond number ſuppoſed, the ſecond term; and the given number, the third. See the article RULE *of Three*.

Or the reſult is to be regulated by this proportion, viz. As the total ariſing from the error to the true total, ſo is the ſuppoſed part to the true one. Example: A, B, and C, deſigning to buy a quantity of lead, to the value of 140 *l.* agree that B ſhall pay as much again as A, and C as much again as B; what then muſt each pay?

Now

Now ſuppoſe A to pay 10*l.* then B muſt pay 20*l.* and C, 40*l.* the total of which is 70*l.* but ſhould be 140*l.* Therefore, if 70*l.* ſhould be 140*l.* what ſhould 10*l.* be?

Anſwer, 20*l.* for A's ſhare, which doubled makes 40*l.* for B's ſhare, and that again doubled gives 80*l.* for C's ſhare, the total of which is 140*l.*

Double poſition, is when there can be no partition in the numbers to make a proportion. In this caſe, therefore, you muſt make a ſuppoſition twice, proceeding therein according to the tenor of the queſtion. If neither of the ſuppoſed numbers ſolve the proportion, obſerve the errors, and whether they be greater or leſs than the ſuppoſition requires, and mark the errors accordingly with the ſigns + and —. See the article CHARACTER.

Then multiply contrarywiſe the one poſition by the other error, and if the errors be both too great, or both too little, ſubtract the one product from the other, and divide the difference of the products by the difference of the errors. If the errors be unlike, as the one + and the other —, add the products, and divide the ſum thereof by the ſum of the errors added together: for the proportion of the errors is the ſame with the proportion of the exceſſes or defects of the numbers ſuppoſed to be the numbers ſought: or the ſuppoſitions and their errors being placed as before, work by this proportion as a general rule, viz. as the difference of the errors, if alike (or their ſum, if unlike) to the difference of the ſuppoſitions, ſo either error to a fourth number, which accordingly added to or ſubtracted from the ſuppoſition againſt it, will anſwer the queſtion.

POSITION, in geometry, is a term ſometimes uſed in contradiſtinction to magnitude: thus, a line is ſaid to be given in poſition, *poſitione data*, when its ſituation, bearing, or direction, with regard to ſome other line is given: on the contrary, a line is given in magnitude, when its length is given but not its ſituation.

POSITION, is alſo uſed for a theſis or propoſition maintained in the ſchools. See the article THESIS.

POSITIVE, a term of relation ſometimes oppoſed to negative: hence a poſitive quantity, in algebra, is a real or affirmative quantity, or a quantity greater than nothing; thus called, in oppoſition to a privative or negative quantity, which is leſs than nothing, and marked by this ſign —. Poſitive quantities are deſigned by this character + prefixed or ſuppoſed to be prefixed to them. See the articles NEGATIVE, QUANTITY, and CHARACTER.

POSITIVE, is alſo uſed in oppoſition to relative or arbitrary: thus we ſay, beauty is no poſitive thing but depends on the different taſtes of people. See the article RELATIVE.

POSITIVE DEGREE, in grammar, is the adjective in its ſimple ſignification, without any compariſon; or it is that termination of the adjective, which expreſſes itſelf ſimply, and abſolutely, without comparing it with any other: thus, *durus*, hard, *mollis*, ſoft, &c. are in the poſitive degree: but *durior*, harder, and *mollior*, ſofter, &c. in the comparative degree; and *duriſſimus*, hardeſt, and *molliſſimus*, ſofteſt, &c. in the ſuperlative degree. See the articles COMPARATIVE and SUPERLATIVE.

POSITIVE, in muſic, denotes the little organ uſually placed behind or at the feet of an organiſt, played with the ſame wind and the ſame bellows, and conſiſting of the ſame number of pipes with the larger one, though thoſe much ſmaller, and in a certain proportion: this is properly the choir-organ.

POSSE COMITATUS, in law, ſignifies the power of the county, or the aid and aſſiſtance of all the knights, gentlemen, yeomen, labourers, ſervants, apprentices, &c. and all others within the county that are above the age of fifteen, except women, eccleſiaſtical perſons, and ſuch as are decrepit and infirm.

POSSESSION, in law, the holding or occupying of any thing, either de jure or de facto.

Poſſeſſion de jure, is the title a man has to enjoy a thing, though it be uſurped and in the actual poſſeſſion of another; or where lands are deſcended to a perſon, and he has not yet entered into them: and poſſeſſion de facto, or actual poſſeſſion, is where there is an actual or effectual enjoyment of a thing.

POSSESSIVE, in grammar, a term applied to pronouns which denote the enjoyment or poſſeſſion of any thing, either in particular or in common: as *meus*, mine, and *tuus*, thine; *noſter*, ours, and *veſter*, yours. See the article PRONOUN.

POSSIBILITY, *Poſſibilitas*, in law, is defined to be any thing that is altogether uncertain, or what may or may not be, and is taken to be either near or remote.

A near poſſibility, is where an eſtate is limited to one after another's deceaſe, whilſt a remote poſſibility is ſomething extraordinary, that is never likely to come to paſs.

POSSIBLE, *Poſſibile*, is ſometimes oppoſed to real exiſtence, and underſtood of a thing which, though it does not actually exiſt, yet may exiſt; as a new ſtar, another world, &c. which are particularly ſaid to be phyſically poſſible.

It is alſo oppoſed to impoſſible, in which ſenſe it is applicable to any thing that does not contradict itſelf, or involve contradictory predicates, whether it actually exiſt or not, as a man, fire, &c. theſe are alſo ſaid to be logically poſſible.

POST, a courier or letter-carrier, or one who frequently changes horſes, poſted or placed on the road, for quicker diſpatch.

The word is alſo applied to the houſes where ſuch a perſon takes up and lays down his charge.

Penny-POST, a poſt eſtabliſhed for the benefit of London and the adjacent parts; by which any letter or parcel not exceeding ſixteen ounces weight, or ten pounds value, is ſpeedily conveyed to and from all parts within ten miles of London.

POST, in the military art, is any place or ſpot of ground fortified or not, where a body of men may make a ſtand and fortify themſelves, or remain in a condition to fight an enemy. Hence it is ſaid, that the poſt was relieved, the poſt was taken ſword in hand, &c.

Advanced POST, is a ſpot of ground ſeized by a party to ſecure the army, and cover the poſts that are behind.

POSTS, in building, large pieces of timber placed upright in houſes. The poſts framed into breſſummers for ſtrengthening the carcaſe of a houſe, are called prick-poſts, and the corner poſts are called the principal poſts.

Burning a little the ends of the poſts that are to be ſet into the ground, is ſaid to be an excellent method to prevent them from rotting.

POSTS, in ſculpture, are ornaments formed after the manner of rolls or wreathings; ſome of which are ſimple, and others enriched or flouriſhed.

POSTERIOR, a term of relation implying ſomething behind, or that comes after another, in which ſenſe it is uſed in oppoſition to prior and anterior.

POSTERN, in general, is a ſmall gate generally made in the angle of the flank of a baſtion, or in that of the curtin, or near the orillon, deſcending into the ditch; by which the garriſon may march in and out unperceived by the enemy, either to relieve the works, or to make private ſallies, &c.

POSTHUMOUS, a child born after the death of his father, or taken out of the body of a dead mother, from whence it is frequently applied to the works of an author not publiſhed till after his deceaſe.

POSTIL, a name anciently given to a note in the margin of the Bible, and afterwards to one in any other book poſterior to the text.

POSTING, among merchants, the putting an account forward from one book to another, particularly from the journal or waſte-book to the ledger. See the article BOOK.

POSTIQUE, in architecture, an ornament of ſculpture ſuperadded after the work is done. A table of marble, or other matter, is alſo ſaid to be poſtique, when it is incruſtated in a decoration of architecture, &c.

POSTPONING, putting any thing after or behind another, with regard to time.

POSTSCRIPT, an article added to a letter or memoir, containing ſomething learnt or recollected after the piece was written.

POSTULATE, *Poſtulatum*, in mathematics, &c. is deſcribed to be ſuch an eaſy, and ſelf-evident ſuppoſition, as needs no explication or illuſtration to render it intelligible; as, that a right-line may be drawn from one point to another. That a circle may be deſcribed on any center given, of any magnitude, &c. however, authors are not well agreed as to the ſignification of the term poſtulatum; ſome make the difference between axioms and poſtulata to be the ſame as that between the theorems and the problems; axioms, according to thoſe authors, being indemonſtrable theoretical truths. But others will have it, that axioms are primitive and common to all things, partaking of the nature of quantity, and which therefore may become the objects of mathematical ſcience; ſuch as number, time, extenſion, weight, motion, &c. and that poſtulata relate particularly to magnitudes, ſtrictly ſo called, as to things having local extenſion, ſuch as lines, ſurfaces, and ſolids; ſo that, in this ſenſe of the word poſtulatum, Euclid, beſides axioms, or thoſe principles which are common to all kinds of quantities, has aſſumed certain poſtulata to be granted him peculiar to extenſive magnitude. Hence ſeveral of the principles aſſumed in his elements, and ranked among the axioms by the moderns, are by Proclus ranked among the poſtulata, which has induced Dr. Wallis to judge, that the laſt of the two ſenſes given to the term poſtulatum is moſt agreeable to the meaning of the ancient geometers.

POSTURE, in painting and ſculpture, the ſituation of a figure with regard to the eye, and of the ſeveral principal members thereof with regard to one another, whereby its action is expreſſed.

POTABLE, *Potabilis*, ſomething that may be ſwallowed by way of drink.

POTAMOGETON, pond-weed, in botany, a genus of plants, whoſe flower conſiſts of four roundiſh, obtuſe, concave, patent, and unguiculated petals, with four obtuſe filaments topped with twin antheræ: there is no pericarpium; the ſeeds are four in number, roundiſh and acuminated, gibbous on one ſide, and compreſſed and angulated on the other..

This plant has a refrigerating virtue, and is recommended in the cure of old ulcers.

POT-ASH, the lixivious aſhes of certain vegetables uſed in the making of glaſs, ſoap, &c. See the articles GLASS, SOAP, &c.

POTATOE, in botany, the Engliſh name for a ſpecies of the tuberoſe-rooted ſolanum. See the article SOLANUM.

Culture of POTATOES.—Theſe roots being become a very common food among us, it may not be improper to mention their propagation and management: they may be encreaſed from ſeeds, but this is uncertain, as they are rarely perfect, and are more readily propagated by their roots, which multiply very faſt if planted in a proper ſoil; therefore there is no neceſſity for practiſing any other method. The latter end of March is the ſeaſon for planting them; the common way is either to plant the ſmall roots entire,

entire, or to cut the large roots in pieces, leaving an eye or two to each piece; this method is very well in the contracted diſtance the gardeners commonly plant them, which is not above a foot aſunder; but if the roots are choſen large and fair, without cutting, and planted at the diſtance of a foot and a half in the rows, and two feet and a half row from row, they will have room to extend their fibres, which will produce a greater quantity of roots, and larger, on the ſame ſpace of ground, than in the common method: the depth they ſhould be planted is about ſeven inches, but it is a wrong practice to plant them with a dibber, as it leaves a cavity underneath the plant; therefore they are beſt planted after the plough in the furrows, or where the ſpade is uſed, in the trenches.

When the plants are come up, the earth ſhould be well ſtirred with a hoe, which will deſtroy the weeds, and let in the rains and dews more readily, which is of ſingular ſervice to the plants, and being repeated a ſecond time, will be all that is neceſſary, as the ſtalks will cover the ground and keep down the growth of weeds, whereby it will be rendered clean for any ſucceeding crop.

In autumn the haulm ſhould be mowed down, and the roots taken up ſoon after and laid in a ſheltered place, which the froſt cannot eaſily penetrate, where they may be kept for uſe.

The ſoil in which potatoes thrive beſt is a light ſandy loam, not too dry or too moiſt, which ſhould be well wrought before planting, and a good quantity of rotten dung intermixed with it, which will make them grow luxuriantly.

POTENT, or POTENCE, a term for a kind of a croſs, whoſe ends all terminate like the head of a crutch. It is otherwiſe called the Jeruſalem croſs.

POTENTIAL, in grammar, an epithet applied to one of the moods of verbs.

The potential is the ſame in form with the ſubjunctive, and is, according to Ruddiman, implied in that mood, for which reaſon that grammarian rejects it: but others will have it to differ from the ſubjunctive in this, that it always implies in it either *poſſum*, *volo*, or *debeo*.

It is ſometimes called the permiſſive mood, becauſe it often implies a permiſſion or conceſſion to do a thing. See the articles MOOD and SUBJUNCTIVE.

POTENTILLA, cinquefoil, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh patent petals, inſerted by their ungues into a monophyllous cup: the ſtamina are twenty ſubulated filaments, topped with long moon-ſhaped antheræ: there is no pericarpium; the receptacle of the ſeeds is roundiſh, ſmall, and permanent, and is included in the cup, and ſurrounded with the ſeeds, which are numerous and acuminated.

The common cinquefoil, which grows naturally in many parts of England, is accounted balſamic, vulnerary, and aſtringent; and has been given in all ſorts of hæmorrhages, as well as in all kinds of fluxes of the belly; and is ſaid to poſſeſs in a great meaſure the virtues of the Peruvian bark, whence the expreſſed juice of it is of great uſe in intermittent fevers.

POTERIUM, garden-burnet, in botany, a genus of plants, producing male and female flowers on the ſame ſpike; the corolla of the male flower is formed of a ſingle petal, cut into four ovate, concave, patent ſegments, with a great number of capillary filaments, topped with roundiſh twin antheræ; the female flower is monopetalous and rotated: the fruit is a berry, the outer cruſt of which is formed of the indurate tube of the corolla, and contains two ſeeds.

This plant is propagated in gardens; the young tender leaves are put in ſallads, and are likewiſe uſed for cool tankards in hot weather; it is reckoned to be cordial and alexipharmic, and the powder of the root it recommended againſt ſpitting of blood.

POTHOS, in botany, a genus of plants, whoſe flower-cup is a globoſe ſpatha; the corolla conſiſts of four wedge-ſhaped, oblong, erect petals, having four broad erect filaments, topped with ſmall twin antheræ: the fruit is a roundiſh aggregate berry, with two cells, each containing one roundiſh ſeed.

POTION, *Potio*, a liquid medicine, conſiſting of as much as can be drank at one draught.

POTTERY, the manufacture of earthen-ware, or the art of making earthen veſſels.

Chineſe POTTERY. See the article PORCELAIN.

POTTLE, an Engliſh meaſure containing two quarts. See the article MEASURE.

POULTICE, or POULTIS, a form of medicine alſo called a cataplaſm. See the article CATAPLASM.

POULTRY, all kinds of domeſtic birds brought up in yards, as cocks, hens, capons, ducks, turkeys, &c.

POUNCE, gum ſandaric pounded and ſifted very fine, to rub on paper, in order to preſerve it from ſinking, and to make it more fit to write upon.

POUNCE, is alſo a little heap of charcoal-duſt, incloſed in a piece of muſlin or ſome other open ſtuff, to be paſſed over holes pricked in a work, in order to mark the lines or deſigns thereof on paper, ſilk, &c. placed underneath; which are to be afterwards finiſhed with a pen and ink, a needle, or the like. This kind of pounce is much uſed by embroiderers, to transfer their patterns upon ſtuffs; by lace-makers, and ſometimes alſo by engravers.

POUNCES, in falconry, the talons or claws of a bird of prey. See the article FALCONRY.

POUND,

POUND, *Libra*, a ſtandard-weight, for the proportion and ſubdiviſions of which, ſee the article WEIGHT.

POUND, alſo denotes a money of account; ſo called, becauſe the ancient pound of ſilver weighed a pound troy. See the article MONEY.

POUND, among lawyers, denotes a place of ſtrength, in which to keep cattle that are diſtrained, or put in for treſpaſs, until they are replevied or redeemed.

POUNDAGE, a ſubſidy of 12 *d.* in the pound, granted to the crown on all goods and merchandizes exported or imported; and if by aliens, one penny more.

POURSUIVANT, or PURSUIVANT, in heraldry, the loweſt order of officers at arms.

POWDER, *Pulvis*, in pharmacy, a dry medicine well broken, either in a mortar, by grinding, or by chemical operations.

POWDERINGS, among builders, certain deviſes, ſerving to fill up vacant places in carved works.

POWER, *Potentia*, in phyſiology, the faculty of doing or ſuffering any thing.

POWER, in mechanics, denotes any force, whether of a man, a horſe, a ſpring, the wind, water, &c. which being applied to a machine, tends to produce motion. See the articles MACHINE and ENGINE.

The intenſity of a power is its abſolute force; that is, its force, ſuppoſing its velocity equal to its weight: for its moving or acting force may be greater or leſs, according as its velocity is increaſed or diminiſhed, in reſpect of that of the weight.

When we ſpeak of the mechanical powers, the word power is taken in a very different ſenſe from that above laid down; ſince, in this caſe, it ſignifies only an organ or inſtrument, whereby a power of a known intenſity is made to act upon a weight: and therefore we muſt take care not to attribute any real force to any ſimple or compound machine, as many are apt to do, merely becauſe the name power has been given to mechanical organs, not from their effect, but from the effect which the power produces by their means.

For how much ſoever the force of a power is thereby increaſed, in order to ſuſtain or raiſe a weight far ſuperior to it in intenſity; yet this cannot be done without loſing in ſpace and time what is gained in force; contrary to what ſome have vainly imagined, becauſe the vulgar commonly ſpeak of a machine as they do of an animal; attributing that effect to the machine, which is only the effect of the power by means of the machine: thus, it is uſual to ſay, ſuch a machine raiſes ſuch a quantity of water, or performs ſuch and ſuch work; when we ſhould ſay, if we would ſpeak philoſophically, ſuch a running ſtream, ſuch a fall of water, the wind, or ſo many men, horſes, oxen, &c. raiſe ſo much water in ſuch a time, &c. by means of ſuch or ſuch a machine. It were therefore to be wiſhed, that the word power were to be confined to its proper ſenſe, and not uſed to ſignify one of the mechanical organs; however, as it has been cuſtomary to uſe it in that ſenſe, we have done ſo too, but withal thought proper to give the preceding caution.

The ſimple mechanical organs or powers are the lever, balance, axis in peritrochio, pulley, ſcrew, wedge, and inclined plane. See the articles LEVER, BALANCE, &c.

POWER, in law, ſignifies, in general, a particular authority, granted by any perſon to another to repreſent him, or act in his ſtead.

POWERS, in arithmetic and algebra, are nothing but the products ariſing from the continual multiplication of a number, or quantity, into itſelf: thus, 2, 4, 8, 16, 32, &c. are the powers of the number 2; and a, a^2, a^3, a^4, &c. the powers of the quantity a; which operation is called involution. See the articles INVOLUTION and BINOMIAL.

POX, or SMALL-POX, *Variolæ*, in medicine, a contagious diſeaſe appearing on the ſurface of the ſkin, which it covers with puſtules, or ulcerous eruptions, that frequently leave ſcars behind them.

French-POX, *Lues Venerea*, is defined a malignant and putredinous dyſcraſy of all the humours, but eſpecially of the ſerum and lympth, ariſing from a venereal taint received into the body; or, according to Sydenham, when a gonorrhœa has continued a long while, or long enough for the poiſonous matter to make its way into the blood; or by aſtringents given unſeaſonably, it cannot make its exit, then the patient is infected with the French pox. See the article GONORRHOEA.

The buboes in the groin conſtitute the firſt degree of this diſtemper: then follow pains of the head, joints, of the ſhoulders, arms, and ancles, coming on by fits, but at no certain intervals, unleſs in the night, when the patient is warm in bed. See the article BUBO.

There are alſo ſcabs and ſcurfs in various parts of the body, which are as yellow as a honey-comb; ſometimes they have large ſurfaces, anſwering the deſcription which authors give of the leproſy. All theſe ſymptoms gradually increaſe, eſpecially the pain, which becomes ſo intenſe that the patient is unable to lie in bed. Afterwards nodes or exoſtoſes ariſe in the ſkull, ſkin-bones, and bones of the arms, which being attended with conſtant pain and inflammation, at length grow carious and putrefied: phagedenic ulcers likewiſe ſeize various parts of the body, but generally begin with the throat, then gradually creep by the palate to the cartilage of the noſe, which they deſtroy, and the noſe being deſtitute of its prop, falls down flat. The ulcers and pains daily encreaſing, the patient ſinks under the torment, and one member rotting away after another, is hurried into his grave.

PRAC-

PRACTICE, in arithmetic, or rules of practice, are certain compendious ways of working the rule of proportion, or golden-rule. See RULE *of Three*.

PRÆ, a Latin prepoſition, literally ſignifying *before*, and uſed in many words in our language, to denote the relation of priority; though they are often written with the common *e* indead of the *æ*; as præceſſion or preceſſion, prædeceſſor or predeceſſor, &c.

PRASIUM, in botany, a genus of plants, whoſe flower is monopetalous and ringent, the upper lip is erect, roundiſh, and ſlightly emarginated; the lower lip is broad, trifid, and reflexed; the fruit conſiſts of four roundiſh unilocular berries, placed in the bottom of the cup, and containing ſolitary roundiſh ſeeds.

PRATIQUE, or PRATTIC, in commerce, a negotiation, or communication, of commerce, which a merchant-veſſel obtains in the port it arrives in, and the countries it diſcovers: hence to obtain a pratique, is to obtain a liberty to frequent a port, to go aſhore, to buy and ſell, &c.

Pratique is particularly uſed for a licence to traffic, granted to the maſter of a ſhip in the ports of Italy upon a bill of health; that is, a certificate that the place whence he came is not annoyed with any infectious diſeaſe.

PRAYER, in theology, a petition put up to God, either for the obtaining ſome future favour, or the returning of thanks for a paſt one.

PREACHING, in theology, the promulgation of the word of God in public; or the making a ſermon, or public oration, on ſome paſſage in the ſacred Scriptures, in order to inform the judgment, and mend the lives of the hearers.

PREADAMITE, a denomination given to the inhabitants of the earth who, according to ſome people, lived before Adam.

PREAMBLE, in law, the beginning of an act of parliament, &c. which ſerves to open the intent of the act, and the miſchiefs intended to be remedied by it.

PREBEND, the maintenance a prebendary receives out of the eſtate of a cathedral or collegiate church. Prebends are diſtinguiſhed into ſimple and dignitary; a ſimple prebend has no more than the revenue for its ſupport; but a prebend with dignitary, has always a juriſdiction annexed to it.

PREBENDARY, an eccleſiaſtic who enjoys a prebend.

The difference between a prebendary and a canon is, that the former receives his prebend, in conſideration of his officiating in the church; but the latter merely by his being received into the cathedral or college.

PRECEDENT, in law, a caſe which has been determined, and which ſerves as a rule for all of the ſame nature: thus the precedents of a court have the force of laws, and no court will reverſe a judgment contrary to many precedents.

PRECENTOR, a dignitary in cathedrals, popularly called the chantor, or maſter of the choir.

PRECEPT, in law, a command in writing ſent by a chief juſtice, juſtice of the peace, &c. for bringing a perſon, record, or other matter, before him.

Precept is alſo uſed for the command or incitement by which one man ſtirs up another to commit felony, theft, &c.

PRECESSION, *Præceſſio*, in aſtronomy, a term applied to a ſlow motion of the equinoctial points towards the weſt; that is, in the language of aſtronomers, *in antecedentia*, or contrary to the order of the ſigns. See SIGN.

This motion of the equinoctial points is occaſioned by the poles of the world revolving round thoſe of the ecliptic: in order to illuſtrate which, let D C H (plate LXXIII. *fig.* 13.) be the part of the earth's orbit, C its center, E C the axis of the ecliptic, E its pole, C P the axis of the earth, P its pole; through the points E and P draw the great circle E P A, meeting the ecliptic A L in A; the arch P A is equal to the inclination of the axis of the earth to the plane of the ecliptic, viz. the angle P C H, which is found by obſervation to be about 66° 30′, and therefore its complemental arch E P, or angle P C E = 23° 30′.

Through the pole P, from the point E, deſcribe a leſſer circle P F G, which will be parallel to the ecliptic; then, if the axis of the earth be directed at any particular time to P, it is found by obſervation of many years, that it will not be conſtantly directed to the point P, but in ſeventy-two years time be directed to ſome other point Q, ſo that the arch P Q = 1 degree; and therefore, in the ſpace of 360 × 72 = 25920 years, the point P, or pole of the world, will deſcribe the circle P F G, about the pole of the ecliptic E, which revolution is called *annus magnus*, the great year; after which, the ſtars being re-inſtated in their proper places, the ancients imagined there would be a total renovation of all things.

The cauſe of this conical motion of the earth's axis was unknown to all the aſtronomers before Sir Iſaac Newton's time, none of them being able to gueſs from whence it could proceed; but this ſublime geometer ſoon inveſtigated its cauſe, and demonſtrated that it reſults from the laws of motion and gravity, that is, from the ſpheroidical figure of the earth; for if the earth was a perfect ſphere, its axis would always continue parallel to itſelf, and conſequently have no ſuch motion. Hence the reaſon of the proceſſion of the equinoctial points may be eaſily conceived; for the circle E P A, paſſing through both the pole of the ecliptic and equator, will be the ſolſtitial colure, and A the ſolſtitial point,

when the axis of the earth points to P; but after ſeventy-two years, when it points to Q, then the great circle E Q B will be the ſolſtitial colure, and B the ſolſtice. And becauſe the equinoctial points are always ninety degrees diſtant from the ſolſtices, they muſt conſequently move in the ſame time, through the ſame arch, and the ſame way, viz. weſtward, or in antecedentia.

This retrograde motion, by carrying the equinoctial points to meet the ſun in his apparent annual motion, makes him arrive at them ſooner every year than he would do if thoſe points continued immoveable: and this arch of regreſſion being 50″ a year, or one degree in ſeventy-two years, makes the equinoxes happen 20′ in time ſooner each year than they would otherwiſe do. And though this change be not ſenſible in a few years, yet theſe points are found to have a very different ſituation from what they had two thouſand years ago.

By reaſon of this preceſſion of the equinoctial points, the fixed ſtars ſeem to move towards the eaſt, and thereby to have their longitude, which is always reckoned upon the ecliptic, from the vernal equinoctial point, encreaſed: and hence the conſtellations ſeem to have deſerted the places allotted them by the antient aſtronomers; for inſtance, the beginning of the ſign aries, which in Hipparchus's time, was near the vernal equinoctial point, and gave name to that point of the ecliptic, is now removed near a whole ſign, or thirty degrees, eaſtward; ſo that aries is now where taurus uſed to be, taurus where gemini uſed to be, &c. and thus all the conſtellations of the zodiac have changed their antient places; but to avoid confuſion, aſtronomers have thought fit to let the ſeveral portions of the ecliptic, where theſe conſtellations were at firſt obſerved to be, retain their old names; ſo that the vernal equinoctial point is ſtill reckoned the firſt degree of aries. However, theſe portions of the ecliptic, where the conſtellations were at firſt, are called *anaſtra*, to diſtinguiſh them from the places where they now are, which are termed *ſtellata*.

PRECIPITANT, *Præcipitans*, in chemiſtry, is applied to any liquor, which, when poured on a ſolution, ſeparates what is diſſolved, and makes it precipitate, or fall to the bottom of the veſſel.

PRECIPITATE, *Præcipitatus*, in chemiſtry, a ſubſtance which having been diſſolved in a proper menſtruum, is again ſeparated from its ſolvent, and thrown down to the bottom of the veſſel, by pouring ſome other liquor upon it.

PRECIPITATION, *Precipitatio*, a proceſs in chemiſtry, which is a kind of ſeparation, whereby the particles of a body diſſolved and ſuſpended in any menſtruus liquor, are detached therefrom, and fall down to the bottom of the veſſel. Theſe particles ſometimes precipitate of their own accord, but oftener by the aſſiſtance of ſome other liquor added to the menſtruum. So that precipitation is the reſeparating ſolid bodies from any fluid menſtruum, wherein they are diſſolved, by the addition of a third body, which, counteracting the power of the menſtruum, cauſes that which was diſſolved to regain its ſolid form, and ſubſide in the ſtate of a powder.

PRECONTRACT, in law, properly ſignifies a contract made before another, but is chiefly applied to marriage-contracts.

PRECORDIA, *Præcordia*, in anatomy, a general name to the parts ſituated about the heart, in the fore-part of the thorax; as the diaphragm, pericardium, and even the heart itſelf, with the ſpleen, lungs, &c.

PREDESTINATION, in general, ſignifies a decree of God, whereby, from all eternity, he ordained ſuch a concatination of cauſes as muſt produce every event by a kind of fatal neceſſity, and maugre all oppoſition. See the articles FATE, NECESSITY, &c.

Nothing has occaſioned more diſputes than this thorny ſubject of predeſtination; the Lutherans ſpeak of it with horror, whilſt the Calviniſts contend for it with great zeal; the Moliniſts and Jeſuits preach it down as a moſt dangerous doctrine, whilſt the Janſeniſts aſſert it as an article of faith; the Arminians, Remonſtrants, and Pelagians, are all avowed enemies to predeſtination.

PREDETERMINATION, in philoſophy, that concurrence of God, which determines men in all their actions, both good and evil; and this concurrence, or influence, is called phyſical predetermination, or premotion: for divines maintain, that God has no ſhare in the ſins of mankind, inaſmuch as he only affords his concurrence to the phyſical part of their actions, not to the moral part.

PREDIAL TITHES, are thoſe that are paid of things ariſing and growing from the ground only; as corn, hay, fruit, &c. See the article TITHES.

PREDICABLE, among logicians, denotes a general quality which may be predicated, or aſſerted of ſeveral things: thus animal is predicable of mankind, beaſts, birds, fiſhes, &c.

PREDICAMENT, among logicians, the ſame with category. See CATEGORY.

PREDICATE, *Prædicatum*, in logic, that part of a propoſition which affirms or denies ſomething of the ſubject: thus, in theſe propoſitions, *ſnow is white*, *ink is not white*, whiteneſs is the predicate which is affirmed of ſnow, and denied of ink.

PREDICATING, in logic, the act of affirming or denying ſomething of a thing, as a man is not an angel; body is a ſubſtance, &c.

PREDICTION, *Prædictio*, the foretelling of what is to come, either by divine revelation, art, or conjecture.

PREDOMINANT, *Prædominans*, that which prevails, or has ſome ſuperiority, over another thing.

PREEN-

PREENING, in natural hiſtory, the action of birds dreſſing their feathers, to enable them to glide the more readily through the air, &c.

PRE-EXISTENCE, *Præ-exiſtentia*, the ſtate of a thing actually in being before another.

PREFACE, *Præfatio*, ſomething introductory to a book, to inform the reader of the deſign, method, &c. obſerved therein; and generally whatever is neceſſary to facilitate the underſtanding of a book.

PREFECT, *Præfectus*, in ancient Rome, one of the chief magiſtrates, who governed in the abſence of the kings, conſuls, and emperors.

PREGNANCY, *Graviditas*, the ſtate of a woman who has conceived, or is with child. See the articles GENERATION, CONCEPTION, &c.

PREJUDICE, *Præjudicium*, does not mean a judgment merely as prior to another in reſpect of time, but as being paſſed before the things were duly conſidered and fully underſtood. Hence prejudice is ſometimes called anticipation, and a preconceived opinion; and makes one of the many cauſes of error. See ERROR.

PRELATE, an eccleſiaſtic raiſed to ſome eminent and ſuperior dignity in the church; as biſhops, archbiſhops, patriarchs, &c. See BISHOP, &c.

PRELIMINARY, in general, denotes ſomething to be examined and determined, before an affair can be treated of to the purpoſe.

PRELUDE, *Præludium*, in muſic, is uſually a flouriſh or irregular air, which a muſician plays offhand, to try if his inſtrument be in tune, and ſo lead him into the piece to be played. Very often the whole band in the orcheſtra run a few diviſions, to give the tune.

PREMISES, or PREMISSES, *Præmiſſæ*, in logic, an appellation given to the two firſt propoſitions of a ſyllogiſm, as going before, or preceding the concluſion.

PREMISES, in law, properly ſignifies the land, &c. mentioned in the beginning of a deed. See the article DEED.

PREMIUM, or PRÆMIUM, properly ſignifies a reward or recompence; but it is chiefly uſed in a mercantile ſenſe for the ſum of money given to an inſurer, whether of ſhips, houſes, lives, &c.

PREMONSTRATENSES, in church-hiſtory, a religious order, inſtituted by St. Norbert, about the year 1119.

PREMOTION, *Præmotio*, the ſame with predetermination. See the article PREDETERMINATION.

PREMUNIRE, or PRÆMUNIRE, in law, is taken two ways; either for a writ, or for the offence for which it is granted.

Formerly the church of Rome carried its pretended right of ſupremacy to ſuch a height, that ſeveral ſtatutes were made to check and reſtrain the growing power of the pope; but more eſpecially ſtat. 16 Richard II. c. 5. commonly known by the name of the ſtatute of premunire, which ordains the puniſhment of offenders or this ſtatute to be this; that they ſhould be out of the king's protection, attached by their bodies, i. e. impriſoned at the king's pleaſure, and loſe their lands, goods, and chattels.

Premunire is now chiefly uſed for the above puniſhment, which is incurred not only by thoſe who aſſert the pope's ſupremacy; but alſo by thoſe who refuſe to take the oath of allegiance, or of the king's ſupremacy, &c.

PRENANTHES, in botany, a genus of plants, the compound flower of which is not imbricated, but conſiſts of five or eight equal hermaphrodite florets, placed in a ſimple round order; theſe are monopetalous, ligulated, and quadritentated, and are ſucceeded by ſolitary heart-ſhaped ſeeds, crowned with hairy down, and contained in the cup.

PRENOMEN, *Prænomen*, among the antient Romans, a name prefixed to their family-name, anſwering to our chriſtian name: ſuch are Caius, Lucius, Marcus.

PREPARATION, *Præparatio*, in mathematics, ſomething preparatory to the demonſtration of a propoſition. Thus if a propoſition in geometry is to be demonſtrated, the preparation conſiſts in drawing certain lines; and if a propoſition in arithmetic, in ſome computation to be previouſly made to come at the demonſtration.

PREPARATION, in pharmacy, &c. the manner of preparing and managing any medicine, in order to fit it to ſerve the purpoſes for which it is intended.

PREPARATION, in anatomy, the art of preſerving the parts of animals for anatomical uſes; which is done either by drying them thoroughly, or putting them in a proper liquor.

PREPENSED, *Præpenſus*, in law, denotes forethought: thus when a man is ſlain upon a ſudden quarrel, if there was malice prepenſed formerly between them, it makes it murder.

PREPOSITION, *Præpoſitio*, in grammar, one of the parts of ſpeech, being an indeclinable particle which yet ſerves to govern the nouns that follow it; ſuch as *per*, *pro*, *propter*; and through, for, with, &c.

F. Buffier allows it to be only a modificative of a part of ſpeech, ſerving to circumſtantiate a noun.

PREPUCE, *Præputium*, in anatomy, the foreſkin; being a prolongation of the cutis of the penis, covering the glans.

PREROGATIVE, *Prærogativa*, a pre-eminence which one perſon has over another.

PRESAGE, *Præſagium*, in antiquity, denotes an augury, or ſign of ſome future event; which was chiefly taken from the flight of birds, the entrails of victims, &c.

Among phyſicians, the term preſage is ſometimes uſed for prognoſtic ſign.

PRESBYTA, πρεσβυτης, in optics, a perſon whoſe eyes being flat, can ſee diſtant objects diſtinctly, but thoſe near, confuſedly; which defect of ſight got this appellation, becauſe old people are naturally ſubject to it.

Spectacles, or convex-glaſſes, are the only remedy for this defect; for if theſe are well fitted to the degree of flatneſs of the eyes, they cauſe the rays of light to converge in ſuch a manner from near objects, as to make them fall exactly on the retina, and thereby produce diſtinct viſion.

PRESBYTER, in the primitive chriſtian church, an elder, one of the ſecond order of eccleſiaſtics; the other two being biſhops and deacons.

Preſbyter, or elder, is a word borrowed from the Greek tranſlation of the Old-Teſtament, where it commonly ſignifies ruler or governor; it being a note of office and dignity, not of age; and in this ſenſe, biſhops are ſometimes called preſbyters in the New-Teſtament.

PRESBYTERIANS, a ſect of proteſtants, ſo called from their maintaining that the goverment of the church, appointed in the New-Teſtament, was by preſbyteries; that is, by miniſters and ruling elders, aſſociated for its government and diſcipline.

The preſbyterians affirm, that there is no order in the church, as eſtabliſhed by Chriſt and his apoſtles, ſuperior to that of preſbyters; that all miniſters being ambaſſadors of Chriſt, are equal by their commiſſion; and that elder or preſbyter, and biſhop, are the ſame in name and office: for which they alledge, *Acts* xx. 28, &c.

The only difference between them and the church of England, relates to diſcipline and church-government.

PRESCIENCE, in theology, fore-knowledge, or the knowledge which God has of events before they come to paſs.

PRESCRIPTION, in law, is a right or title acquired by uſe and time, introduced for aſſuring the property of effects, in favour of perſons who have for a certain time had them in their poſſeſſion.

PRESCRIPTION, in medicine, is the aſſigning a proper and adequate remedy to a diſeaſe, from an examination of its ſymptoms, and an acquaintance with the virtues and effects of the materia medica.

PRESENT, *Præſens*, in grammar, the firſt tenſe of a verb, expreſſing the preſent time, or that ſomething is now performing; as *ſcribo*, I write, or am writing. See the article TENSE.

PRESENTATION, in law, the act of a patron offering his clerk to be inſtituted in a benefice of his gift, the ſame being void.

PRESENTÉE, the clerk preſented to a benefice by the patron.

PRESENTMENT, in law, a denunciation of jurors, or a juſtice of the peace, or other officers, without any information of an offence inquirable by the court, to which it is preſented; or it may be ſaid to be an information made by the jury in a court before a judge, who has authority to puniſh any offence committed contrary to law; and it is what the grand jury finds and preſents to the court, without any bill of indictment delivered: yet it is afterwards reduced into the form of an indictment.

PRESEPE, or PRÆSEPE, in aſtronomy, the name given to three nebulous ſtars in the breaſt of Cancer. See the article CANCER.

PRESERVATION, in general, denotes the art of preſerving things in a ſtate of perfection; or, at leaſt, from being ſo far corrupted and ſpoiled, as to be no longer uſeful.

Animal ſubſtances are preſerved by curing, pickling, drying, or chemical preparation. See the articles CURING, PICKLING, &c.

For the method of preſerving corn in granaries, ſee the articles CORN and GRANARY.

Fruits may be long preſerved in ſpirit of wine, firſt well ſaturated with the ſkins and tinging parts of thoſe fruits; and many may be tolerably preſerved in perfectly fermented liquors, which generate no more air.

The more ſolid vegetable ſubſtances may be preſerved by gently drying in the ſun, ſhade, or other ſlack heat. Thus peas or beans may be dried young in a ſlack oven in their proper ſeaſon, and may afterwards be boiled in the winter, and will eat young and tender, as if juſt gathered.

The ways of preſerving fruits, both dry and moiſt, with ſugar, are now univerſally known; and there are, in the ſeveral ways, many ſecrets, in the hands of particular artiſts, which it would be well to have generally known. See the article FRUIT.

As for the methods of curing and preſerving vegetable juices and liquors, by decoction, inſpiſſation, fermentation, clarification, matching, &c. See the articles DECOCTION, INSPISSATION, &c.

PRESERVATIVE, among phyſicians, denotes a medicine taken by way of precaution; or, to ſecure a man from a diſeaſe that threatens him.

The principal preſervatives, according to Boerhaave, are abſtinence, quiet, drinking warm water; and, after this, a gentle and continued motion till the firſt appearance of ſweat; then a profound ſleep, the body being well covered.

In the time of a plague, preſervatives are very neceſſary againſt the contagion of the air.

Generous wines, cardiacs, and ſudorifics, are alſo powerful preſervatives.

PRESIDENT, *Præſes*, an officer created or elected to preſide over a company, in contradiſtinction to the other members, who are called reſidents.

PRESS, *Prelum*, in the mechanic arts, a machine of wood, or iron, ſerving to ſqueeze any body very cloſe.

Thus, let A B (plate LXXV. *fig.* 1.) be a cheeſe-preſs; where C E, F G, are levers, move-

able

Fig. 1. A Cheese Press.

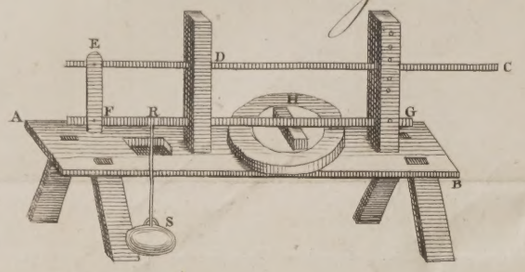


Fig. 4. Printing Press.

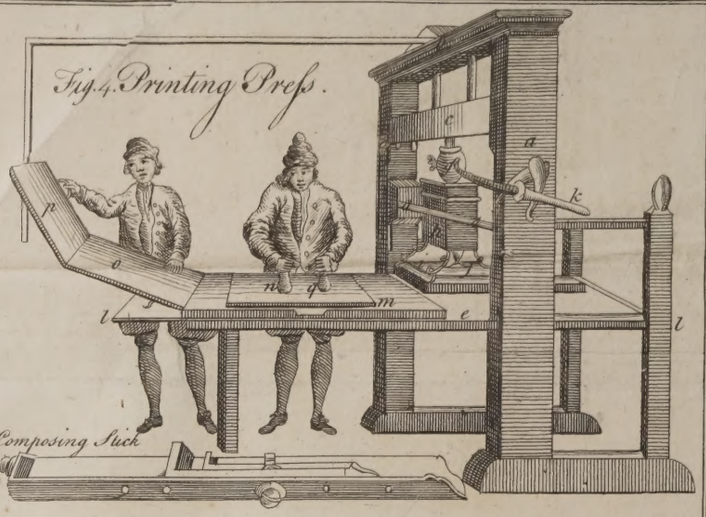


Fig. 2. The Common Wine Press.

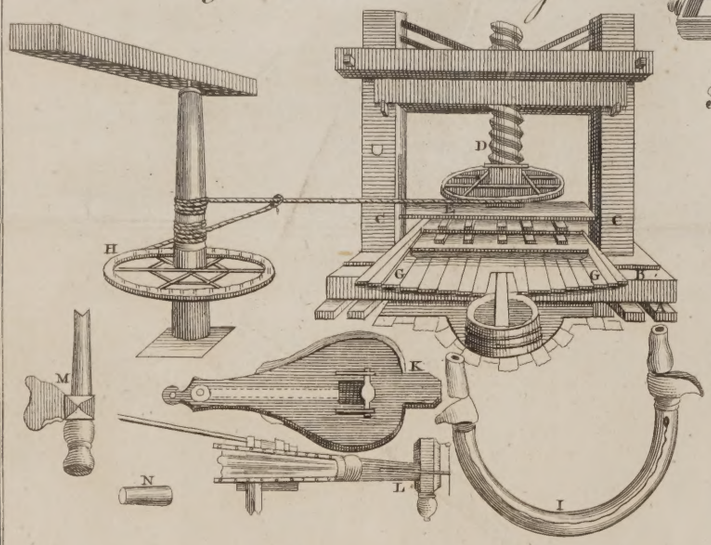


Fig. 3. A Press to make Verjuice, or to Squeeze Apples.

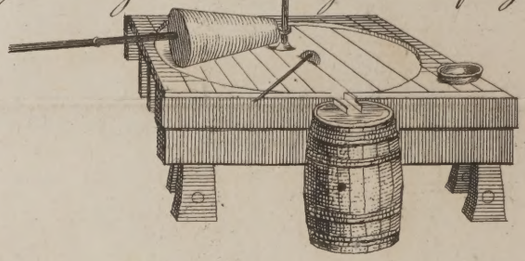


Fig. 5. Rolling Press.

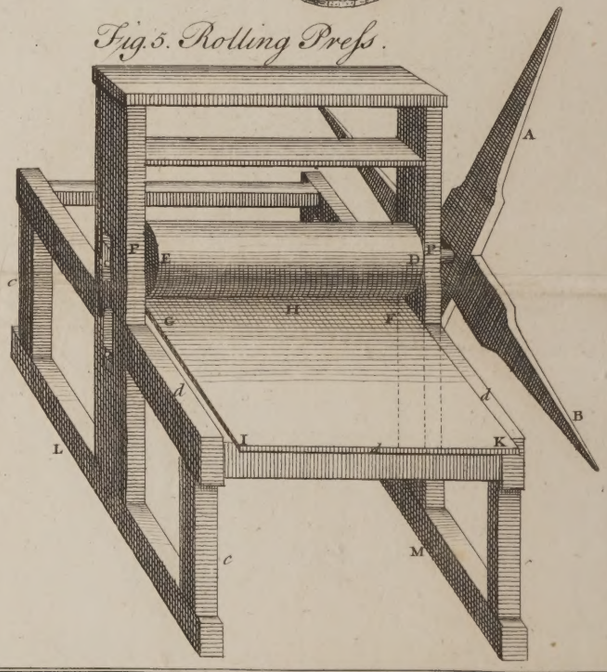
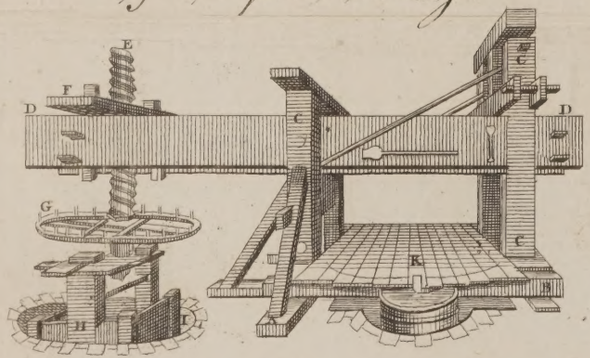


Fig. 3. The Great Wine Press.



T. Sedge sculp.

able about the points, D, E, F, G, by applying the hand at C; S, the ſtone, or weight; and H, the cheeſe to be preſſed.

Now, if CD = 5, DE = 2, FG = 6, GH = 2, FR = 1, FH = 4; then in the lever CE, D is the fulcrum. Call the power at C, 1; then the force at E or F is $\frac{5}{2}$. And in the lever FG, whoſe fulcrum is G, if the power at F be 1, the force at R is $\frac{6}{4}$; and therefore the power at C is to the weight S, as 1 to $\frac{5}{2} \times \frac{6}{4}$, or 3. Alſo the weight of the ſtone at R is to the preſſure at H, as 2 to 5, or 1 to $\frac{5}{2}$; and the power at C is to the preſſure at H, as 1 to $3 \times \frac{5}{2}$, or $7\frac{1}{2}$.

Preſſes uſually conſiſt of ſix pieces; two flat ſmooth planks, between which the things to be preſſed are laid; two ſcrews or worms faſtened to the lower plank, and paſſing through two holes in the upper; and two nuts in form of an S, that ſerve to drive the upper plank, which is moveable, againſt the lower, which is fixed.

Preſſes uſed for expreſſing liquors are, in moſt reſpects, the ſame with the common preſſes, only the under plank is perforated with a great number of holes for the juice to run through. Others have only one ſcrew, or arbor, paſſing through the middle of the moveable plank, which deſcends into a kind of ſquare box, full of holes, through which the juices flow, as the arbor is turned.

But that the reader may be enabled to form a more diſtinct idea of theſe preſſes, we ſhall give a draught of the common and great wine-preſs, uſed for ſqueezing the juice out of grapes.

A B (plate LXXV. *fig.* 2.) is the baſe or pedeſtal and other ſupporters of the common wine-preſs. C, C, the cheeks, which are upright beams, the lower extremities of which are ſunk in the earth, where they are ſtrongly fixed by croſs bars and maſonry: they are traverſed at top by two beams, the lowermoſt of which is the nut, or receptacle of the ſcrew. D is the ſcrew with its wheel. E the bearer, or large piece of timber on which the wheels reſt, in order to ſink the beams croſſing the planks that cover the grapes, F. G, G, the maye, or planks on which the grapes are diſpoſed, in order to be ſqueezed: theſe planks are cut in notches, to receive the liquor and convey it to a veſſel appropriated to receive it. The maye is ſupported on a maſſive work of maſonry. H is the wheel that ſerves to force down the ſcrew and bearer upon the grapes, which are laid upon the maye in a ſquare heap: this it does by winding off the cord from the wheel of the ſcrew D, by which means the ſcrew and the bearer, E, are preſſed down upon the grapes, which are uſually covered with croſs-beams, reared above each other. I is a leather pipe, terminating in two wooden tubes, for conveying the wine from one piece to another. K is a large bellows to agitate the wine when it has ſettled into an even ſurface in both veſſels. L the ſame bellows in profile. M is a large fountain, which affords a quick flow. And N is a ſtopple to cloſe the veſſel newly filled, and prevent the wine from running over, upon withdrawing the wooden tube.

A B (*fig.* 3.) repreſents the baſe and other ſupports of the great wine-preſs; C, C, &c. the cheeks or ſide-beams; D, D, great beams, two in number at leaſt, and frequently four, or even ſix; E the ſcrew; F the nut of the preſs; G the wheel, which by the help of five or ſix men, turns the ſcrew; and H the cage, which is an aſſemblage of ſeveral ſtrong pieces of timber formed into a ſquare, and lined with maſonry within. This cage is ten feet long, and four and a half broad on each ſide, and may be either raiſed out of, or ſunk into, the pit of maſonwork I; from whence it is exhibited as aſcending in the figure referred. It uſually weighs three thouſand pounds; and being ſuſpended in the manner repreſented, forms, in conjunction with the ſcrew, a lever of an immenſe force, for ſqueezing down a bearer upon grapes placed upon the maye K, as in the former figure. See the article WINE.

As to cyder-preſſes, the beſt and leaſt chargeable is that called the box-preſs (*fig.* 4.) with which you may ſqueeze apples, pears, grapes, or any other fruit to make cyder, perry, wine, or verjuice: for, as one end of the box terminates in a moveable beam, which is worked by a wheel and a ſcrew in the uſual manner; ſo there are holes in the ſide of the box, through which the juice flows, by a ſpout, into a veſſel deſigned to receive it. See the article CYDER.

PRESSURE, or PRESSION, in general, denotes the ſqeezing a thing cloſe together.

PREST, a duty in money paid by the ſheriff upon his account in the exchequer, for money remaining in his hands.

PREST-MONEY, the money given to new 'liſted ſoldiers, ſo called becauſe it binds thoſe who receive it, to be ready at all times.

PRESTATION, ſignifies the payment of a certain ſum by archdeacons, and other clergymen, annually to their biſhop.

PRESTER, in phyſiology, a meteor conſiſting of an exhalation, thrown from the clouds downwards with ſuch violence, as by the colliſion it is ſet on fire.

It differs from the thunderbolt in the manner of its inflammation, and its burning and breaking every thing it touches with great vehemence.

PRESUMPTION, in law, ſignifies an opinion or belief of a thing.

PRESUMPTIVE HEIR, the ſame with heir at law. See the article HEIR.

PRETENCE, or *Eſcutcheon of* PRETENCE, in heraldry. See the article ESCUTCHEON.

PRETERITE, *Præteritum*, in grammar, a tenſe which expreſſes the time paſt, or an action completely finiſhed; as *ſcripſi*, I have wrote, &c.

PRETERITION, in rhetoric, a figure whereby, in pretending to paſs over a thing untouched, we take a ſummery veiw of it.

PRETEXT, a colour or motive, whether real or feigned, for doing ſomething.

PRETOR, or PRÆTOR, a magiſtrate among the ancient Romans, not unlike our lord chief juſtices, or lord-chancellor, or both in one; as being veſted with the power of diſtributing juſtice among the citizens.

PRETORIAN GUARDS, *Prætoriæ Cohortæ*, in Roman antiquity, were the emperor's guards, who at length were increaſed to ten thouſand; according to ſome, they had this denomination from their being ſtationed at a place in the palace called Pretorium: their commander was ſtiled præfectus prætorii.

PREVARICATION, *Prævaricatio*, in the civil law, is where the informer colludes with the defendants, and ſo makes only a ſham proſecution.

PREVARICATION, in our laws, is when a man falſely ſeems to undertake a thing, with intention that he may deſtroy it; where a lawyer pleads booty, or acts by colluſion, &c.

PREVARICATOR, *Prævaricator*, at Cambridge, is a maſter of arts, choſen at a commencement, to make an ingenious ſatirical ſpeech, reflecting on the miſdemeanors of the principal members.

PREVENTION, *Præventio*, in the canon-law, &c. the right which a ſuperior perſon has to claim or tranſact an affair, prior to an inferior one.

PRIAPISM, πριαπισμος, in medicine, a continual and painful erection of the penis.

PRIAPUS, in medicine, denotes the genital parts in men.

It alſo denotes, in antiquity, a fabulous deity, revered very much for the extraordinary ſize of his parts.

PRICKING, in the ſea language, is to make a point on the plat or chart, near about where the ſhip then is, or is to be at ſuch a time, in order to find the courſe they are to ſteer. See the articles NAVIGATION and SAILING.

PRIEST, *Sacerdos*, a perſon ſet apart for the performance of ſacrifice, and other offices of religion.

PRIEST, *Preſbyter*, in the chriſtian church, is a perſon inveſted with holy orders; in virtue whereof he has a power to preach, pray, adminiſter the ſacrament, &c. Alſo in the Romiſh church, to bleſs, abſolve, &c.

PRIMÆ VIÆ, among phyſicians, denotes the whole alimentary duct; including the oeſophagus, ſtomach, and inteſtines, with their appendages.

PRIMAGE, in commerce, a ſmall duty at the water-ſide, uſually about twelve-pence per tun, or ſix-pence a bale, due to the maſter and mariners of a ſhip; to the maſter for the uſe of ropes, &c. to diſcharge the goods; and to the mariners, for the loading or unloading of the veſſel.

PRIMARY-PLANET, in aſtronomy, one that revolves round the ſun as a center.

PRIMATE, *Primas*, in church-polity, an archbiſhop, who is inveſted with a juriſdiction over other biſhops.

PRIME, *Primus*, an appellation given to whatever is firſt in order, degree, or dignity, among ſeveral things of the ſame or like kind; thus we ſay, the prime miniſter, prime coſt, &c.

Prime is ſometimes uſed to denote the ſame with decimal, or the tenth part of an unit. See the article DECIMAL.

In weights, it ſtands for the twenty-fourth part of a grain. See WEIGHT and GRAIN.

PRIME *Figure*, in geometry, one which cannot bedivided into any other figures more ſimple than itſelf, as a triangle among planes, and the pyramid among ſolids. See the article FIGURE.

For prime numbers, in arithmetic, ſee the article NUMBER.

PRIME *of the Moon*, is the new moon, when ſhe firſt appears, which is about three days after the change. See the article MOON.

PRIME VERTICAL, is that vertical circle which paſſes through the poles of the meridian, or the eaſt and weſt points of the horizon; whence dials projected on the plane of this circle, are called prime vertical, or north and ſouth dials. See the articles VERTICAL, DIAL, &c.

PRIME, in the Romiſh church, is the firſt of the canonical hours, ſucceeding to lauds.

PRIME, in fencing, is the firſt chief of the guards. See the article GUARD.

PRIMING, or PRIME *of a Gun*, is the gunpowder put into the pan or touch-hole of a piece, to give it fire thereby; and this is the laſt thing done in charging.

PRIMING, among painters, ſignifies the laying on of the firſt colours.

PRIMITIVE, in grammar, is a root or original word in a language, in contradiſtinction to derivative: thus, *God* is a primitive; *godly*, derivative; and *god-like*, a compound.

PRIMOGENITURE, *Primogenitura*, the right of firſt-born.

PRIMULA, the primroſe, in botany, a genus of plants, whoſe flower is monopetalous; the tube is cylindraceous; the length of the cup and the limb is expanded, and divided into five cordated ſegments: the ſtamina are five ſhort filaments, placed in the neck of the corolla, and terminated by erect acuminated antheræ: the fruit is an oblong capſule, opening at the top, and filled with roundiſh ſeeds.

This genus includes the auricula of Tournefort, and the polyanthus of the gardeners. See the articles AURICULA and POLYANTHUS.

The common primroſe grows almoſt every where, among fields, woods, and ſhady places; the flowers,

leaves,

leaves, and roots, are reckoned good in paralytic and arthritic complaints.

PRIMUM MOBILE, in the Ptolemaic ſyſtem of aſtronomy. See the article MOBILE.

PRINCE, *Princeps*, in polity, a perſon inveſted with the ſupreme command of a ſtate, independent of any ſuperior.

Prince alſo denotes a perſon who is a ſovereign in his own territories, yet holds of ſome other as his ſuperior.

PRINCE *of the Senate*, in old Rome, the perſon who was called over firſt in the roll of ſenators, whenever it was renewed by the cenſors: he was always of conſular and cenſorian dignity. See the article SENATE.

PRINCE'S-FEATHER, in botany. See the article AMARANTHUS.

PRINCE'S-METAL. See METAL.

PRINCIPAL, *Principalis*, the chief and moſt neceſſary part of a thing.

In commerce, principal is the capital of a ſum due or lent, ſo called in oppoſition to intereſt.

It alſo denotes the firſt fund put by partners into a common ſtock, by which it is diſtinguiſhed from the calls or acceſſions afterwards acquired.

PRINCIPAL *Point*, in perſpective, is a point in the perſpective plane, upon which a line drawn from the eye, perpendicular to the plane, falls. It is in the interſection of the horizontal and vertical plane, and called the point of ſight, and point of the eye.

PRINCIPAL *Ray*, in perſpective, that which paſſes perpendicularly from the ſpectator's eye to perſpective plane.

PRINCIPLE, *Principium*, in general, is uſed for the cauſe, ſource, or origin of any thing.

PRINCIPLE is alſo ſometimes uſed in a ſynonymous ſenſe with axiom or maxim. See the articles AXIOM and MAXIM.

PRINOS, the winter-berry, in botany, a genus of plants, whoſe flower is monopetalous and rotated, with the limb divided into ſix plane ſegments. The fruit is a roundiſh berry, having ſix cells, containing ſolitary, oſſeous, obtuſe ſeeds.

PRINT, the impreſſion taken from a copper-plate.

PRINTER, a perſon who compoſes and takes impreſſions from moveable characters ranged in order, or front-plates engraven, by means of ink, and a preſs; or from blocks of wood cut in flowers, &c. and taken off in various colours on calicoes, linens, ſilks, &c.

PRINTING, the art of taking impreſſions from characters or figures, moveable or immoveable, on paper, linen, ſilk, &c. There are three kinds of printing, the one from moveable letters for books; the other from copper-plates for pictures; and the laſt from blocks, in which the repreſentation of birds, flowers, &c. are cut for printing calicoes, linens, &c. the firſt, called common preſs-printing, the ſecond rolling-preſs printing, and the laſt calicoe, &c. printing. The principal difference between the three conſiſts in this, that the firſt is caſt in relievo in diſtinct pieces, the ſecond engraven in creux, and the third cut in relievo, and generally ſtamped, by placing the block upon the materials to be printed, and ſtriking upon the back of it.

Progreſs of PRINTING. Who the firſt inventors of the European method of printing books were, in what city, and what year it was ſet on foot, are queſtions long diſputed among the learned. In effect, as the Grecians contended for the birth of Homer, ſo do the German printers for that of printing. Mentz, Haerlem, and Straſburg, are the warmeſt on this point of honour, and theſe are left in poſſeſſion of the queſtion, which is not yet decided: though it muſt be owned, that Mentz has always had the majority of voices. John Guttemburg, and John Fuſt, of Mentz; John Mentel, of Straſburg, and L. John Koſter, of Haerlem, are the perſons to whom this honour is ſeverally aſcribed, by their reſpective country-men; and they have all their advocates among the learned. However, their firſt eſſays were made on wooden blocks, after the Chineſe manner. The book at Haerlem, the vocabulary called Catholicon, and the pieces in the Bodleian library, and that of Bennet-college, are all performed this way; and the impreſſion appears to have been only given on one ſide of the leaves; after which the two blank ſides were paſted together. But they ſoon found the inconveniencies of this method, and therefore bethought themſelves of an improvement; which was by making ſingle letters diſtinct from one another; and theſe being firſt done in wood, gave room for a ſecond improvement, which was the making them of metal; and, in order to that, forming moulds, matrices, &c. for caſting them. See LETTER.

From this ingenious contrivance we ought to date the origin of the preſent art of of printing, contradiſtinguiſhed from the method practiſed by the Chineſe. And of this, Schoeffer, or Scheffer, firſt ſervant, and afterwards partner and ſon-in-law of Fuſt, at Mentz, above-mentioned, is pretty generally allowed to be the inventor: ſo that he may properly be reckoned the firſt printer; and the Bible, which was printed with moveable letters in 1450, the firſt printed book; the next was Auguſtine de civitate Dei; then Tully's Offices, printed about the year 1461. In theſe books they left the places of the initial letters blank, and gave them to the illuminers, to have them ornamented and painted in gold and azure, in order to render the book more beautiful, and, as ſome think, to make their books paſs for manuſcripts. Thus at preſent, in ſome curious works, the initial letter at the beginning of a book

a book, or chapter, is ſometimes left out, and a ſpace is left for its being afterwards printed with various ornaments from a copper-plate.

Some authors tell us, that Fuſt carrying a parcel of bibles with him to Paris, and offering them to ſale as manuſcripts; the French, upon conſidering the number of books, and their exact conformity to each other, even to a point, and that it was impoſſible for the beſt book-writers to be ſo exact, concluded there was witchcraft in the caſe, and by their actually indicting him as a conjurer, or threatening to do ſo, extorted from him the ſecret: and hence the origin of the popular ſtory of Dr. Fauſtus.

From Mentz, the art of printing ſoon ſpread itſelf throughout a good part of Europe; Haerlem and Straſburg had it very early; which, as the current of authors repreſent it, occaſioned their pretending to the honour of the invention. From Haerlem it paſſed to Rome in 1467; and into England in 1468, by means of Thomas Bourchier, archbiſhop of Canterbury, who ſent W. Turner, maſter of the robes, and W. Caxton, merchant, to Haerlem to learn the art. Theſe privately prevailing with Corſeilles, an under-workman, to come over, a preſs was ſet up at Oxford, and an edition of Ruffinus on the creed was printed the ſame year in octavo. From Oxford, Caxton brought it to London about the year 1470, and the ſame year it was carried to Paris. Hitherto there had been nothing printed but in Latin, and the vulgar tongues; and this firſt in Roman characters, then in Gothic, and at laſt in Italic; but in 1480, the Italians caſt a ſet of Greek types, and they have alſo the honour of the firſt Hebrew editions which were printed about the ſame time with the Greek. Towards the end of the ſixteenth century, there appeared various editions of books, in Syriac, Arabic, Perſian, Armenian, Coptic or Egyptian characters, ſome to gratify the curioſity of the learned, and others for the uſe of the Chriſtians of the Levant. Out of Europe, the art of printing has been carried into the three other parts of the world: for Aſia, we ſee impreſſions of books at Goa, and in the Philippines; at Morocco, for Africa; at Mexico, Lima, Philadelphia, New-York, Boſton, &c. for America. The Turks, indeed, rigorouſly prohibit printing throughout their empire, as imagining that the too frequent communication with books might occaſion ſome change in their religion and government; yet the Jews have ſeveral editions of their books printed at Theſſalonia, and even at Conſtantinople.

Method of PRINTING. The printing-letters, or types, as they are ſometimes called, we have already taken notice of, and have deſcribed the method of forming and caſting them under the articles LETTER and LETTER-FOUNDERY.

The workmen employed in the art of printing are of two kinds; compoſitors, who range and diſpoſe the letters into words, lines, pages, &c. according to the copy delivered them by the author: and preſſmen, who apply ink upon the ſame, and take off the impreſſion. The types being caſt, the compoſitor diſtributes each kind by itſelf among the diviſions of two wooden frames, an upper and an under one, called caſes; each of which is divided into little cells or boxes. Thoſe of the upper caſe are in number ninety-eight; theſe are all of the ſame ſize, and in them are diſpoſed the capitals, ſmall-capitals, accented letters, figures, &c. the capitals being placed in alphabetical order. In the cells of the lower-caſe, which are fifty-four, are placed the ſmall letters, with the points, ſpaces, &c. The boxes are here of different ſizes, the largeſt being for the letters moſt uſed; and theſe boxes are not in alphabetical order, but the cells which contain the letters oftenеſt wanted, are neareſt the compoſitor's hand. Each caſe is placed a little aſlope, that the compoſitor may the more eaſily reach the upper-bozes. The inſtrument in which the letters are ſet is called a compoſing-ſtick, (ſee plate LXXV. *fig.* 5.) which conſiſts of a long and narrow plate of braſs or iron, &c. *cc*, on the right ſide of which ariſes a ledge *bb*, which runs the whole length of the plate, and ſerves to ſuſtain the letters, the ſides of which are to reſt againſt it: along this ledge is a row of holes, which ſerve for introducing the ſcrew *f*, in order to lengthen or ſhorten the extent of the line, by moving the ſliders *e*, *d*, farther from, or nearer to the ſhort ledge at the end *a*. Where marginal notes are required in a work, the two ſliding pieces *e*, *d*, are opened to a proper diſtance from each other; in ſuch a manner as that while the diſtance between *d* and *c* forms the length of the line in the text, the diſtance between the two ſliding-pieces forms the length of the lines for the notes on the ſide of the page. Before the compoſitor proceeds to compoſe, he puts a rule, or thin ſlip of braſs plate, cut to the length of the line, and of the ſame height as the letter in the compoſing-ſtick, againſt the ledge, for the letter to bear againſt. Things thus prepared, the compoſitor having the copy lying before him, and his ſtick in his left-hand, his thumb being over the ſlider *d*; with the right he takes up the letters, ſpaces, &c. one by one, and places them againſt the rule, while he ſupports them with his left thumb by preſſing them to the end of the ſlider *d*; the other hand being conſtantly employed in ſetting in more letters: the whole being performed with a degree of expedition and addreſs not eaſy to be imagined.

A line thus compoſed, if it end with a word or ſyllable, and exactly fill the meaſure, there needs no farther care; otherwiſe more ſpaces are to be put in, or elſe the diſtances leſſened between the

ſeveral

things, therefore, cannot be ſufficiently dried for triture, without exhaling their better parts, or deſtroying that particular quality for which the ſimple is valued in medicine, as it happens with many ſeeds and gums, they are much better in any other form than this. The other requiſite in this form, relating to the preſervation of things reduced into it, directs not to preſcribe materials therein which are volatile, or will any other way change in the open air. The preparations, intentions, &c. of the ſeveral powders uſed in medicine, may be ſeen under their ſeveral heads. See POWDER.

PULVIS FULMINANS, among chemiſts, a powder ſo called from its ſmart and loud exploſion, when it begins to melt after being placed upon an iron plate over a gentle fire. It is prepared thus: take three ounces of purified nitre, and one ounce of brimſtone, and grind them well together in a mortar; then putting a ſmall quantity, as about half a dram, over the fire, in the manner already mentioned, it will make a great exploſion. The more philoſophical way of accounting for this effect of the pulvis fulminans is, according to Dr. Shaw, by ſuppoſing that the acid ſpirits of the nitre and ſulphur being looſened by the heat, ruſh towards one another, and towards the ſalt of the tartar, with ſo great a violence, as by the ſhock at once to turn the whole into vapour and ſmoke.

PUMICE, in natural hiſtory, a ſlag or cinder of ſome foſſil, originally bearing another form, and only reduced to this ſtate by the action of the fire, though generally ranked by authors among the native ſtones. It is a lax and ſpungy matter, frequently of an obſcure, ſtriated texture in many parts, and always very cavernous and full of holes; it is hard and harſh to the touch, but much lighter than any other body that comes under the claſs of ſtones. It is found in maſſes of different ſizes, and of a perfectly irregular ſhape, from the bigneſs of a pigeon's egg to that of a buſhel. We have it from many parts of the world, but particularly from about the burning mountains Ætna, Veſuvius, and Hecla, by whoſe eruptions it is thrown up in vaſt abundance; and being by its lightneſs ſupported in the air, is carried into ſeas at ſome diſtance by the winds, and thence to diſtant ſhores. The great uſe of pumice among the antients, ſeems to have been as a dentifrice, and at preſent it is retained in the ſhops on the ſame account.

PUMMEL. See the article POMMEL.

PUMP, *Antlia*, in hydraulics, a machine formed on the model of a ſyringe, for raiſing water. See the article SYRINGE.

The theory of pump-work depends, in a great meaſure, upon the properties of the inverted ſyphon: thus, let ABCDEFG (plate LXXVII. *fig.* 12.) repreſent an inverted ſyphon, ABCD a column of air, and DG the lower part of the pipe of a pump, immerſed in the water of the well HI. Let P be the piſton of the pump at E in its loweſt ſituation, and at F in its higheſt. Now, as both theſe parts communicate with the water, one by preſſing on it, the other by opening into it, they may be looked upon as communicating with one another.

Wherefore, ABCD (the column of air) would by its weight or preſſure force up a column of water into the pipe DG to the height of thirty-two feet, were the air exhauſted from the ſaid pipe, and continued to that height; ſince the weight of a column of air is equal to that of ſuch a column of water of the ſame baſe. If, therefore, the piſton P be thus thruſt down to E, meeting the water there, and from thence it be raiſed to F with an uniform motion, the water will riſe from E to follow the piſton with a variable motion; the leaſt of which is as $\sqrt{AC-DE}$, and the greateſt as $\sqrt{AC-DE} = \sqrt{AB}$.

If in lifting up the piſton, the velocity of the water be leſs than that of the piſton, it will not be able to follow it; but will leave a ſpace between them, which will increaſe more and more as the velocity of the water becomes leſs than that of the piſton. The conſequence of this will be, that a part of the ſtroke of the piſton will be loſt; and not only that, but the piſton, when the water leaves it, will riſe very hard, as having a weight of water upon it, and the air of greater denſity above than below; whence the equilibrium, which ought to be in pumps, is deſtroyed, and the balance againſt the workman.

Now as this can happen even where the diameter of the ſucking-pipe is equal to that of the pump-barrel, it muſt happen much ſooner when the ſucking-pipe is leſs than the barrel; becauſe the water riſing thro' a leſs paſſage, will be longer in filling the pump-barrel, and conſequently muſt quit the piſton, and leave the greater void ſpace between. On the contrary, if the leaſt velocity of the water, riſing into the pipe, be greater than that of the piſton, there will be no void ſpace; and the pump-barrel may be made in proportion as much wider than the ſucking-pipe, as the velocity of the water is greater than that of the piſton.

Now, that this may be the caſe, we ſhall ſhew by calculation what diameters the barrel and pipe ought to have, compared with the velocity of the water and piſton.

Let A repreſent the leaſt altitude of the atmoſphere AC = 31 feet of water; B = DF the higheſt elevation of the piſton above the ſurface of the water HI, which let be 16 feet. And let the greateſt velocity of the piſton which can well be given to a pump be that of four feet in a ſecond = v; and V = the leaſt velocity of the water that riſes in the pipe; D = the diameter of the barrel; and d = the diameter of the pipe.

Now here we have $\sqrt{A} - \sqrt{B} = V =$ the leaſt velocity of water; and the fall which will produce

that velocity is the ſquare of that expreſſion, viz. $A+B-2\sqrt{AB}$, that is, $31+16-2\sqrt{31\times 10}=2$ feet 6 inches, the height of the fall required. Whereas, by the common way of taking the ſquare of $\sqrt{A-B}$, viz. A—B for the height, we have 15 feet for the fall, which extraordinary error muſt be of very bad conſequence in practice.

Here the velocity $\sqrt{A}-\sqrt{B}=\sqrt{31}-\sqrt{16}=5{,}6-4=1{,}6$ per ſecond. The velocity of the water, at the bottom of the pipe D, is as $\sqrt{A}=5{,}6$; that alſo muſt be the velocity of the piſton at D, that the water may follow it; whence the piſton moving with the ſame velocity at F, where the velocity is but 1,6, we have $5{,}6-1{,}6=4$ feet of void ſpace; therefore 4 parts in 5,6 of ſuch a ſtroke would be loſt or ineffectual. We may here obſerve, by the way, that ſince the velocity of the water at D is 5,6, and the greateſt velocity which can be given to the piſton (without damaging the machinery) is but 4; therefore a piſton, working at the lower end of the pipe or barrel, will always have water more than enough to prevent any void ſpace or loſs of labour.

But, ſince we find ſo great a void in the pipe at F, of the ſame diameter with the piſton, it is evident, if we contract all the part below F into a ſmall pipe at *FD*, and let the part F G remain as it was for the barrel for the piſton to play in, as at *FG*, that then the water will riſe into the barrel *FG* with a greater velocity than before, in proportion as the pipe is leſs; conſequently, if the bore of the pipe *FD* be to that of the barrel *FG*, as the velocity of the piſton P, or the water in the barrel, is to the velocity of the water in the pipe, there will always be a ſufficiency of water to prevent a vacuum in the barrel. Which rule in ſymbols is thus expreſſed, $DD:dd::V:v$; whence $D^2v=d^2V$ for a general canon; any three of which quantities being given, the fourth may be found. Thus, for example, ſuppoſe D, v, and V, were given to find d, we have $d=\frac{D\sqrt{v}}{\sqrt{V}}$.

Let the diameter of the barrel $D=6$ inches; and ſuppoſe the piſton gives 20 ſtrokes in a minute, each a two feet ſtroke, ſpending as much time in its aſcent as deſcent; then will the motion of the piſton be 80 feet per minute, or $1\frac{1}{3}$ per ſecond; whence, $v=1\frac{1}{3}$. Laſtly, to obtain the value of V, we muſt fix on the length of the pipe *FD*, which let be 16 feet; then the higheſt elevation of the piſton will be 18 feet (if it comes to the bottom of the barrel, as it ought to do); wherefore, a height of water of 18 feet in the pump *GD*, acts againſt the weight or height of 31 feet in the leg AC. Now, the velocity V of the water in the pipe *FD* being uniform, or conſtantly the ſame, we muſt find what difference of uniform velocities will be generated by falls from 31 and 18 feet heights. Thus $\sqrt{16\frac{1}{9}}:32::\sqrt{31}:43$ nearly; and $\sqrt{16\frac{1}{9}}:32::\sqrt{18}:32\frac{3}{4}$; whence the difference of theſe uniform velocities will be $43-32\frac{3}{4}=10\frac{1}{4}=10$ feet three inches per ſecond; therefore $V=10\frac{1}{4}$. Wherefore $\frac{D\sqrt{v}}{\sqrt{V}}=d=2\frac{1}{10}$ inches of the diameter of the pipe *FD*.

The reaſon why we make no uſe of the expreſſion $\sqrt{AB}-\sqrt{DF}$ in this caſe, is, becauſe this gives only the difference of the inſtantaneous velocities, or the leaſt velocity with which the water at F can begin its motion upwards; whereas we here want to find what the conſtant and uniform motion of the water will be, or how much it will ſupply every ſecond uniformly, which is done by the method above. For, ſince a fall of $16\frac{1}{9}$ gives an uniform velocity of 32 feet per ſecond, a fall of 31 feet will give 43; thus a fall of 18 feet will give $32\frac{3}{4}$, and their difference muſt be that of the water at F.

If we know the velocity of the piſton v, the diameter of the barrel D, and the diameter of the pipe d, we ſhall find the velocity of the water in the pipe $V=\frac{vDD}{dd}$; or thus in words, multiply the ſquare of the diameter of the barrel by the velocity of the piſton; divide the product by the ſquare of the diameter of the pipe, the quotient will be the velocity ſought from the water in the pipe. This velocity, when found, muſt be taken from 43, the remainder 43—V, will be the uniform velocity produced by a fall from the higheſt ſituation of the piſton to the loweſt ſurface of the water in the well, and which is found by ſaying, as $32:\sqrt{16\frac{1}{9}}::43-V:\sqrt{DF}$; whence DF, the higheſt elevation of the piſton, will be known.

When we know D, V, and d, we find v the velocity of the piſton by this theorem $\frac{Vdd}{DD}=v$; that is, in words, multiply the ſquare of the diameter of the pipe by the velocity of the water in it, and divide the product by the ſquare of the diameter of the barrel, the quotient is the velocity of the piſton required.

Having given the velocity of the water in the pipe V, the diameter of the pipe d, the velocity of the piſton v, to find the diameter of the barrel D, we have this theorem $D=\sqrt{\frac{Vdd}{v}}$; that is, multiply the ſquare of the diameter of the pipe by the velocity of its water, and divide that product by the velocity of the piſton; the ſquare root of the quotient is the diameter of the barrel ſought.

PUN, or PUNN, a conceit ariſing from the uſe of two words that agree in ſound, but differ in the ſenſe. Ariſtotle deſcribes two or three kinds of puns among the beauties of good writing, and produces inſtances of them out of ſome of the greateſt authors

authors in the Greek tongue. Cicero has ſprinkled ſeveral of his works with puns; and in his book, where he lays down the rules of oratory, quotes abundance of ſayings, which he calls pieces of wit, that upon examination prove perfect puns.

PUNCH, an inſtrument of iron or ſteel, uſed in ſeveral arts, for the piercing or ſtamping holes in plates of metals, &c. being ſo contrived as not only to perforate, but to cut out and take away the piece.

PUNCHEON, PUNCHIN, or PUNCHION, a little block or piece of ſteel, on one end whereof is ſome figure, letter or mark, engraven either in creux or relievo, impreſſions whereof are taken on metal, or ſome other matter, by ſtriking it with a hammer on the end not engraved. There are various kinds of theſe puncheons uſed in the mechanical arts; ſuch for inſtance are thoſe of the goldſmiths, cutlers, pewterers, &c.

PUNCHEON, is alſo uſed for ſeveral iron-tools of various ſizes and figures, uſed by the engravers in creux on metals. Seal-gravers particularly uſe a great number for the ſeveral pieces of arms, &c. to be engraven, and many ſtamp the whole ſeal from a ſingle puncheon.

PUNCHEON, is alſo a common name for all thoſe iron inſtruments uſed by ſtone-cutters, ſculptors, black-ſmiths, &c. for the cutting, inciding, or piercing their ſeveral matters.

PUNCHEON, in carpentry, is a piece of timber placed upright between two poſts, whoſe bearing is too great, ſerving, together with them, to ſuſtain ſome large weights.

PUNCHEON, is alſo uſed for the arbor, or principal part of a machine, whereon it turns vertically, as that of a crane, &c.

PUNCHEON, is alſo a meaſure for liquids, containing an hogſhead and one third, or eighty-four gallons.

PUNCTATED HYPERBOLA, an hyperbola whoſe oval conjugate is infinitely ſmall, i. e. a point.

PUNCTUATION, in grammar, the art of pointing or of dividing a diſcourſe into periods, by points, expreſſing the pauſes to be made in the reading thereof. See the article POINT.

PUNCTUM, in geometry, &c. See the article POINT.

PUNCTUM SALIENS, in anatomy, the firſt rudiments of the heart in the formation of the fœtus, where a throbbing motion is perceived. This is ſaid to be eaſily obſerved with a microſcope in a brood egg, wherein, after conception, we ſee a little ſpeck or cloud, in the middle whereof is a ſpot that appears to beat or leap a conſiderable time before the fœtus is formed for hatching. See the article FOETUS.

PUNCTURE, in ſurgery, any wound made by a ſharp pointed inſtrument.

PUNICA, the POMEGRANATE-TREE, in botany. See the article POMEGRANATE.

PUNISHMENT, in law, the penalty which a perſon incurs on the breach or tranſgreſſion of any law.

PUNITORY INTEREST, in the civil law, ſuch intereſt of money as is due for the delay of payment, breach of promiſe, &c.

PUPIL, *Pupillus*, in the civil law, a boy or girl not yet arrived at the age of puberty, i. e. the boy under fourteen, years the girl under twelve.

PUPIL is alſo uſed in univerſities, &c. for a youth under the education or diſcipline of any perſon.

PUPIL, *Pupilla*, in anatomy, a little aperture in the middle of the uvea and iris of the eye, through which the rays of light paſs to the cryſtalline, in order to be painted on the retina, and cauſe viſion.

The ſtructure of the uvea and iris, is ſuch as that by their aperture the pupil is contractible and dilatible at pleaſure, ſo as to accommodate itſelf to objects, and to admit more or fewer rays; as the object, being either more vivid and near, or more obſcure and remote, requires more or leſs light: it being a conſtant law, that the more luminous the object is, the ſmaller the pupil; and again, the nearer the object, the ſmaller the pupil; and *vice verſa*. This alteration of the pupil is effected by certain muſcular fibres on the outſide of the uvea, which arrive from the nerves detached hither from the ſclerotica: ſome others attribute the motions of the pupil to the ligamentum ciliare; and others think that both this and the fibres of the uvea concur herein.

There is a diſeaſe of the eyes called a contraction of the pupil, wherein there is ſuch a total or cloſe contraction of that part, that it will not tranſmit light enough to the bottom of the eye, to enable the patient to ſee objects diſtinct; ſometimes this diſorder is from infancy, and ſometimes it ariſes from an intenſe inflammation of the eye. The cure of this is extremely difficult; but Mr. Cheſelden has invented a method by which he has often proved very ſucceſsful in his attempts to relieve it. The method is this: the eye-lids being held open by a ſpeculum oculi, he takes a narrow ſingle edged ſcalpel, or needle, almoſt like that uſed in couching for the cataract, and paſſing it through the ſclerotica, as in couching, he afterwards thruſts it forward through the uvea, or iris, and in extracting cuts it open through the iris. See the article COUCHING.

PURCHASE, in law, the buying or acquiring of lands, &c. with money, by deed or agreement, and not by deſcent or right of inheritance.

PURCHASE, in the ſea-language, is the ſame as draw in: thus when they ſay the capſtan purchaſes a-pace, they only mean it draws in the cable a-pace.

PURE,

PURE, ſomething free from any admixture of foreign or heterogeneous matters: thus we ſay pure fire, &c. See the article FIRE, &c.

PURE HYPERBOLA, in conics, is an hyperbola without any oval, nodes, ſpike, or conjugate point.

PURFLEW, a term in heraldry, expreſſing ermins, peans, or any of the furs, when they compoſe a bordure round a coat of arms: thus they ſay, he beareth gules a bordure, purflew, vairy: meaning that the bordure is vairy.

PURGATION, the art of purging, ſcouring, or purifying a thing, by ſeparating or carrying off any impurities found therein.

PURGATIVE, or PURGING MEDICINES, a medicament which evacuates the impurities of the body by ſtool, called alſo cathartics.

We have had attempts of adjuſting the doſes of purgative medicines ſcientifically. Dr. Cockburn endeavoured at the ſolution of this problem, but, it is ſaid upon wrong principles. Dr. Balguy, in the Medical Eſſays of Edinburgh, has alſo given us an eſſay on this ſubject. He aſſumes, that part of the medicines is ſpent on the firſt paſſages, where it acts as a ſtimulus; and that the other part is carried into the blood, and has its effects there by thinning and rarifying it. This being premiſed, 1. If the medicine acts only in the firſt paſſages, the doſe will be as the ſize of the perſon into the conſtitution. 2. If the whole medicine paſſes into the blood, the doſe will be as the ſize into the ſquare of the conſtitution; and, therefore, 3. You are to doſe ſo much of the medicine as is ſpent on the ſtomach and inteſtines directly as the conſtitution, and ſo much as is carried into the blood as the ſquare of the conſtitution; and the ſum into the perſons ſize, is the quantity required. The ſame rules hold in vomits. How far in either caſe the practice of phyſic may be thereby improved, we leave to the judgment of the learned. The ſolution of the problem ſuppoſes a great poſtulatum, no leſs than the art of meaſuring a perſon's conſtitution.

PURGATORY, a place in which the juſt, who depart out of this life, are ſuppoſed to expiate certain offences which do not merit eternal damnation.

Broughton has endeavoured to prove, that this notion has been held by Pagans, Jews, and Mahometans, as well as Chriſtians.

The doctrine of purgatory is a very lucrative article to the clergy of the Romiſh church, who are very liberally paid for maſſes and prayers for the ſouls of the deceaſed. We are told by ſome of their doctors, that purgatory is a ſubterraneous place, ſituated over the hell of the damned, where ſuch ſouls as have not yet made ſatisfaction to divine juſtice for their ſins, are purged by fire, after a wonderful and incomprehenſible manner: and here they are purified from thoſe dregs which hinder them from entering into their eternal country, as the catechiſm of the council of Trent expreſſes it.

PURGE, in medicine, the ſame with cathartic. See the article CATHARTIC.

PURIFICATION, in matters of religion, a ceremony which conſiſts in cleanſing any thing from a ſuppoſed pollution or defilement.

The Pagans, before they ſacrificed, uſually bathed or waſhed themſelves in water, and they were particularly careful to waſh their hands, becauſe with theſe they were to touch the victims conſecrated to the gods. It was alſo cuſtomary to waſh the veſſel with which they made their libations. The Mahometans uſe purifications as previous to the duty of prayer; theſe alſo are of two kinds, either bathing, or only waſhing the face, hands and feet. The firſt is requeſted only in extraordinary caſes, as after having lain with a woman, touched a dead body, &c. But leſt ſo neceſſary a preparation for their devotions ſhould be omitted, either where water cannot be had, or when it may be of prejudice to a perſon's health, they are allowed in ſuch caſes to make uſe of fine ſand, or duſt inſtead of it; and then they perform this duty by clapping their open hands on the ſand, and paſſing them over the parts, in the ſame manner as if they were dipped in water.

There were alſo many legal purifications among the Hebrews. When a woman was brough to bed of a male child, ſhe was eſteemed impure for forty days; and when of a female, for ſixty; at the end of which time ſhe carried a lamb to the door of the temple, to be offered for a burnt-offering, and a young pigeon or turtle for a ſin-offering, and by this ceremony ſhe was cleanſed or purified. For other purifications of the Jews, ſee the article IMPURITY.

Among the Romaniſts, the holy water is uſed by way of purification.

PURIFICATION *of the bleſſed Virgin*, a feſtival of the chriſtian church, obſerved on the ſecond of February, in memory of the purification of Chriſt in the temple, and his mother's ſubmitting to the Jewiſh law of purification after the birth of a male child.

PURIFICATION, in chemiſtry, the act of purifying or refining natural bodies by ſeparating the fæces and impurities from them. For the method of purifying metals, ſee the article REFINING, &c.

For the purification of ſemi-metals, ſee the arcles ANTIMONY, SULPHUR, &c.

PURIM, or *the Feaſt of Lots*, a ſolemn feſtival of the Jews, inſtituted in memory of the deliverance they received from Haman's wicked attempt to deſtroy them by means, of Mordecai and Eſther.

PURITAN, a name formerly given in deriſion to the diſſenters from the church of England, on account of their profeſſing to follow the pure word of God, in oppoſition to all traditions and human conſtitutions.

conſtitutions. See the articles INDEPENDENTS, PRESBYTERIANS, &c.

PURLINS, in building, thoſe pieces of timber that lie acroſs the rafters on the inſide, to keep them from ſinking in the middle of their length.

PURLUE, or PURLIEU, ſignifies all that ground near any foreſt, which being made foreſt by king Henry II. Richard I. and king John, was afterwards by perambulations and grants of Henry III. ſevered again from the ſame, and made purlieu; that is to ſay, pure and free from the laws of the foreſt.

The owners of grounds within purlieus, may convert paſture into arable, &c. as alſo incloſe them with any kind of incloſures, or erect edifices upon them, and may diſpoſe of the ſame as if they had never belonged to the foreſt: hence if the wild beaſts chance to wander out of the foreſt into the purlieu, the king has ſtill a property in them, againſt every man except the owner of the ground in which they are who had a ſpecial property in them *ratione ſoli*; yet ſo far as he may take them by hunting with his greyhounds or dogs, without any fore-ſtalling or foreſetting them in their courſe again towards the foreſt.

PURLUE-MAN, or PURLIEU-MAN, a perſon who has ground within the purlieu, and is qualified to hunt within the ſame though under certain reſtrictions.

PURPLE, a colour compoſed of a mixture of red and blue.

PURPLE FEVER, the ſame with miliary fever. See MILIARY FEVER.

PURPURA, in natural hiſtory, a genus of ſimple ſhells, having no hinge, formed of one contiguous piece, and covered from the top to the bottom with ſpines, tubercles, and umbos; the mouth is ſmall, and approaches to a round figure: the clavicle is ſhort, but the other extremity is uſually protended to a conſiderable length.

PURPURE, POURPRE, or PURPLE, in heraldry, according to ſome, is one of the five colours of armories, compounded of gules and azure, bordering on violet, and, according to others, of a great deal of red and a little black. But it was excluded by the ancient heralds as only an imperfect colour. In the coats of noblemen it is called amethyſt; and in thoſe of princes, mercury. It is repreſented in engraving, by diagonal lines drawn from the ſiniſter chief to the dexter baſe point.

PURREL, a liſt ordained by act of parliament to be made at the end of kerſeys, to prevent deceit in diminiſhing their length.

PURSE, a manner of accounting, or a ſpecies of money of account, much uſed in the Levant.

PURSER, an officer aboard a man of war, who receives her victuals from the victualler, ſees that it be well ſtowed, and keeps an account of what he every day delivers to the ſteward. He alſo keeps a liſt of the ſhip's company, and ſets down exactly the day of each man's admiſſion, in order to regulate the quantity of proviſions to be delivered out, and that the paymaſter or treaſurer of the navy may iſſue out the diſburſements, and pay off the men, according to his book.

PURSIVENESS, among farriers, is a diſorder in horſes, otherwiſe called broken wind, in which the horſe makes a hiſſing whiſtling ſound in his throat, and has a greater heaving in the flanks than in common colds.

For the cure of this diſorder, Dr. Bracken adviſes, that the horſe ſhould have good nouriſhment, much corn, but little hay; and that every other day the water given him be impregnated with half an ounce of ſaltpetre, and two drams of ſal armoniac.

PURSLAIN, *Portulaca*, in botany. See the article PORTULACA.

PURULENT, in medicine, ſomething mixed with, or partaking of, pus or matter.

PUS, in medicine, a white or yellowiſh putrid matter, formed of corrupted blood, and contained in a wound or ulcer.

PUSTULE, a pimple, or ſmall eruption on the ſkin full of pus; ſuch are the puſtules of the ſmall pox and French pox. See the article POX.

PUTLOGS, or PUTLOCKS, in building, are ſhort pieces of timber about ſeven feet long, uſed in building ſcaffolds. They lie at right angles to the wall, with one of their ends reſting upon it, and the other upon the poles which lie parallel to the ſide of the wall of the building.

PUTREFACTION, a kind of ſlow corruption produced by heat and ſome moiſt fluid, particularly the air and water; which, penetrating the pores, diſſolves and ſets at liberty ſome of the more ſubtile parts, particularly the ſalts and oils, and thus looſens the compages, and changes the texture of bodies.

PUTRID, ſomething rotten, or putrified.

PUTTY, the ſame with ſpodium. See the article SPODIUM.

PUTTY, in its popular ſenſe, is a kind of paſte compounded of whiting and linſeed oil, beaten together to the conſiſtence of a thick dough.

It is uſed by glaziers for the faſtening in the ſquares of glaſs in faſh-windows, and by painters for ſtopping up the crevices and clefts in timber and wainſcots, &c.

PUTTY ſometimes alſo denotes the powder of calcined tin, uſed in poliſhing and giving the laſt gloſs to works of iron and ſteel.

PYCNOSTYLE, in the antient architecture, is a building where the columns ſtand very cloſe to each other; only one diameter and a half of the column being allowed for the intercolumniations.

According to Mr. Evelyn, the pycnoſtyle chiefly belonged to the Compoſite order, and was uſed in the moſt magnificent buildings; as at preſent in the

peristyle at St. Peter's at Rome, which consists of near three hundred columns; and in such as yet remain of the antients, among the late discovered ruins of Palmyra.

PYCNOTICS, the same with incrassants. See the article INCRASSATING.

PYGME, the same with cubit. See the article CUBIT.

PYGMY, a person not exceeding a cubit in height.

This appellation is given by the antients to a fabulous nation said to have inhabited Thrace; who brought forth young at five years of age, and were old at eight; these were famous for the bloody war they waged with the cranes.

PYLORUS, in anatomy, the right or lower orifice of the stomach, which is connected with and opens into the intestines. See the articles STOMACH and INTESTINES.

PYONY, or PIONY. See PIONY.

PYRACANTHA, in botany, a species of mespilus; this is an ever-green plant; it grows naturally in the hedges in the south of France and Italy: the branches are slender, covered with a dark brown bark, and armed with a few long thorns: the leaves are oval, of a lucid green, smooth, and slightly indented on their edges; the flowers are rosaceous, and come from the side of the branches in large umbels, and are of a dirty white colour; they are succeeded by roundish umbilicated berries, which ripen in winter, and are of a fiery red colour, which being intermixed with the green leaves, make a fine appearance at that season of the year. This plant is either propagated by seeds or layers, and with us is generally planted against walls or buildings, as the stalk and branches are too slender and weak to stand without support.

PYRAMID, πυραμις, in geometry, a solid standing on a triangular, square, or polygonal basis, and terminating in a point at the top; or, according to Euclid, it is a solid figure, consisting of several triangles, whose bases are all in the same plane and have one common vertex.

Hence the superficies of a given pyramid is easily found by measuring these triangles separately; for their sum added to the area of the base, is the surface of the pyramid required.

It is no less easy to find the solid content of a given pyramid; for the area of the base being found, let it be multiplied by the third part of the height of the pyramid, or the third part of the base by the height, and the product will give the solid content, as is demonstrated by Euclid, lib. 12. prop. 7.

If the solid content of a frustum of a pyramid is required, first let the solid content of the whole pyramid be found; from which subtract the solid content of the part that is wanting, and the solid content of the frustum, or broken pyramid, will remain. See FRUSTUM.

PYRAMID, in architecture, a solid massive building, which from a square, triangle, or other base, rises diminishing to a vertex or point.

Pyramids are sometimes used to preserve the memory of singular events; and sometimes to transmit to posterity the glory and magnificence of princes. But as they are esteemed a symbol of immortality, they are most commonly used as funeral monuments. Such is that of Cestius at Rome, and those other celebrated ones of Egypt, as famous for the enormity of their size, as their antiquity. These are situated on the west side of the Nile almost opposite to Grand Cairo; the base of the largest covers more than ten acres of ground, and is, according to some, near seven hundred feet high, though others make it six hundred, and some but little more than five hundred. The pyramid is said to have been, among the Egyptians, a symbol of human life; the beginning of which is represented by the base, and the end, by the apex; on which account it was that they used to erect them over sepulchres.

PYRAMIDAL, something relating to a pyramid. See the preceding article.

PYRAMIDAL NUMBERS. See NUMBER.

PYRAMIDALIA CORPORA, in anatomy, the two protuberances of the medulla oblongata. The spermatic vessels are also by some authors thus termed.

PYRAMIDALIS, in anatomy, a small muscle in the abdomen lying in the lower part of the rectus. It has its name from its figure, and its origin from the margin of the os pubis, with a broad fleshy head, whence it grows gradually narrower, till it ends in a small round tendon in the linea alba, sometimes almost at the navel. This muscle is sometimes single, sometimes it has its fellow, and in some subjects they are both wanting.

Pyramidalis is also the name of one of the dilatores, or muscles which serve to turn up the nose. This muscle rises at the foot of the nose, and is usually contiguous with the frontalis. It descends along the side of the nose, where it is by degrees a little expanded. It is inserted into the alæ of the nose, and often sends down its fibres as far as the upper lip.

PYRAMIDOID, the same with the parabolic spindle.

PYRENOIDES PROCESSUS, in anatomy, a process of the second vertebra of the neck, called also odontoides, and dentiformis.

PYRETHRUM, in the materia medica, the root of a species of the buphthalmum, called, among us, pellitory of Spain. See the article BUPHTHALMUM.

PYRFORMIS, in anatomy, a muscle of the thigh, receiving its name from its figure, which resembles that of a pear. It rises thick from the lower part of the os sacrum, where it is joined to the ileum; from thence it runs transversely towards the

the joint of the hip, and terminates in a ſhort tendon, which is inſerted in the middle of the internal labium of the great trochanter, by two or three branches.

PYRITES, in natural hiſtory, a name uſed by Dr. Hill for a claſs of compound inflammable metallic bodies found in detached maſſes, but of no determinately angular figure. This claſs the Dr. divides into two orders, the firſt of which, being thoſe pyritæ of a plain and ſimple internal ſtructure, comprehends two genera: the firſt genus, termed pyriplaces, are thoſe pyritæ of a ſimple internal ſtructure, aud covered with an inveſtient coat or cruſt; the ſecond genus, termed gymnopyres, are thoſe pyritæ of a ſimple internal ſtructure, and not covered with a cruſt; the ſecond order, being thoſe pyritæ of a regularly ſtriated internal ſtructure alſo, comprehends two genera, the firſt termed pyritricha are thoſe pyritæ of a ſimply ſtriated texture; the ſecond genus, called pyritrichiphylla, are thoſe pyritæ whoſe ſtriæ terminate in foliaceous ends.

This foſſile is recommended by ſome authors as an emmenagogue, but it is ſcarce ever preſcribed with this intention; the common green vitriol, or copperas of the ſhops, is made from it; and an acid ſomewhat different from that of pure vitriol may be drawn off from it by the retort, after it has been expoſed to the air till it moulders away: this is of great uſe in mineralogy, and is a ſolvent for ſeveral foſſils that none of the other acids will touch.

PYROLA, winter-green, in botany, a genus of plants, whoſe flower cup is ſmall, perſiſtent, and cut into five parts; the corolla conſiſts of five roundiſh concave patent petals; the ſtamina are ten ſubulated filaments, terminating with large noding antheræ with two riſing horns. The fruit is a roundiſh, depreſſed, pentagonal capſule, with five cells open at the angles, which are filled with many chaffy ſeeds.

The greater round-leaved pyrola grows naturally in the north of England, on mountainous and woody places, and flowers in June and July: it is reckoned to be aſtringent and vulnerary, and proper to ſtop internal bleedings being taken in the manner of tea.

PYROTECHNY, πυροτεχνια, the art of fire, or a ſcience which teaches the management and application of fire, in ſeveral operations. Pyrotechny is of two kinds, military and chemical: military pyrotechny is the doctrine of artificial fire-works and fire-arms, teaching the ſtructure and uſe of thoſe uſed in war, the attacking of fortifications, &c. as gun-powder, cannons, bombs, granadoes, carcaſſes, mines, fuſees, &c. and thoſe made for amuſement's ſake, as rockets, ſtars, ſerpents, &c. See the articles GUN-POWDER, CANNON, &c.

Chemical pyrotechny is the art of managing and applying fire in diſtillations, calcinations, and other operations of chemiſtry.

PYROTICS, πυρωτικα, in medicine, cauſtics, or remedies, either actually or potentially hot; and which accordingly will burn the fleſh, and raiſe an eſchar. See the article CAUSTICS.

PYRRHICHA, πυρριχη, in antiquity, a kind of exerciſe on horſeback, or a feigned combat, for the exerciſe of the cavalry.

PYRRHICHIUS, in the Greek and Latin poetry, a foot conſiſting of two ſyllables, both ſhort, as *Deus*. See FOOT.

PYRRHONIANS, PYRRHONEANS, or PYRRHONISTS, a ſect of antient philoſophers, ſo called from Pyrrho, a native of Elis, in Peloponneſus. The opinions of theſe philoſophers, who were alſo called ſceptics, terminated in the incomprehenſibility of all things, in which they found reaſon both for affirming and denying; accordingly they ſeemed, during their whole lives, to be in ſearch of truth, without ever acknowledging that they found it: hence the art of diſputing upon all things, without ever going farther than ſuſpending our judgments, is called pyrrhoniſm.

Pyrrho maintained, that life and death were equally indifferent; and he is charged with teaching, that honour and infamy, the juſtice and injuſtice of actions, depended ſolely on human laws and cuſtoms; and, in a word, that there is nothing in itſelf honeſt or diſhoneſt, juſt or unjuſt: an abominable doctrine, that opens the way to all manner of crimes.

PYRUS, the pear-tree, in botany. See the article PEAR.

PYTHAGOREANS, a ſect of antient philoſophers, ſo denominated from their being the followers of Pythagoras of Samos, who lived in the reign of Tarquin, the laſt king of the Romans, in the year of Rome 220; or, according to Livy, in the reign of Servius Tullius, in the year of the world 3472.

Pythagoras, from his extraordinary deſire of knowledge, travelled in order to enrich his mind with the learning of the ſeveral countries through which he paſſed. He was the firſt that took the name of philoſopher, that is, a lover of wiſdom, which implied, that he did not aſcribe the poſſeſſion of wiſdom to himſelf, but only the deſire of poſſeſſing it.

His maxims of morality were admirable; for he was for having the ſtudy of philoſophy ſolely tend to elevate man to a reſemblance of the Deity. He believed that God is a ſoul diffuſed through all nature, and that from him human ſouls are derived; that they are immortal, and that men need only take pains to purge themſelves of their vices, in order to be united to the Deity. He made unity the principle of all things; and believed, that between God and man there are various orders of ſpiritual beings, who are the miniſters of the ſupreme being. He condemned all images of the Deity, and would

have him worſhipped with as few ceremonies as poſſible. His diſciples brought all their goods into a common ſtock, contemned the pleaſures of ſenſe, abſtained from ſwearing, eat nothing that had life, and believed in the doctrine of a metempſychoſis. See the article METEMPSYCHOSIS.

Pythagoras made his ſcholars undergo a ſevere noviciate of ſilence for at leaſt two years; and it is ſaid, that where he diſcerned too great an itch for talking, he extended it to five: his diſciples were therefore divided into two claſſes, of which the firſt were ſimple hearers, and the laſt ſuch as were allowed to propoſe their difficulties, and learn the reaſons of all that was taught there.

The Pythagoreans, it is ſaid, on their riſing from bed, rouſed the mind with the ſound of the lyre, in order to make them more fit for the actions of the day; and at night reſumed the lyre, in order to prepare themſelves for ſleep, by calming all their tumultuous thoughts.

The figurative manner in which he gave his inſtructions, was borrowed from the Hebrews, Egyptians, and other orientals. Some think he derived his philoſophy from the books of Moſes, and that he converſed with Ezekiel and Daniel at Babylon; but this is mere conjecture.

Some authors ſay, that he left nothing in writing; but Laërtius and others attribute ſeveral treatiſes to him. His golden verſes, attributed by ſome to one of his diſciples, are allowed to be an exact copy of the ſentiments of that divine philoſopher, from whoſe ſchool proceeded the greateſt philoſophers and legiſlators.

PYTHIA, in antiquity, the prieſteſs of Apollo at Delphi, by whom he delivered oracles: ſhe was thus called from the god himſelf, who was denominated Apollo Pythios, from his ſlaying the ſerpent Python.

This prieſteſs was to be a pure virgin; ſhe ſat on the lid of a brazen veſſel, mounted on a tripod or three-legged ſtool; and thence, after a violent enthuſiaſm, delivered her oracles in a few ambiguous and obſcure verſes, or in a ſhort ſentence in proſe. See the article ORACLE.

PYTHIAN GAMES, in antiquity, ſolemn games celebrated near Delphi, in honour of Apollo, and in remembrance of his having killed the ſerpent Python.

Theſe were held every two years, about the month Elaphebolion, which anſwered to our February. The celebration of theſe games was attended with the Pythian ſong, in which was celebrated the fight of Apollo and the ſerpent. The victors were crowned with branches of laurel; though, at the firſt inſtitution, the crown was of beech-leaves. See GAMES.

PYXIDIUM, cup-moſs, in botany, a genus of moſſes, conſiſting of a firm, tough, and flexile matter, formed into the ſhape of hollowed cups, or drinking glaſſes, with longer or ſhorter ſtems.

PYXIS NAUTICA, the ſeaman's compaſs. See COMPASS.

PYXIS, in anatomy, the acetabulum, or cavity of the hip-bone. See the articles ACETABULUM and FEMUR.

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Q.

Q, The ſixteenth letter, and twelfth conſonant of our alphabet; but is not to be found either in the Greek, old Latin, or Saxon alphabets: and indeed ſome would entirely exclude it, pretending that *k* ought to be uſed wherever this occurs: however, as it is formed in the voice in a different manner, it is undoubtedly a diſtinct letter; for in expreſſing this ſound the cheeks are contracted, and the lips, particularly the under one, are put into a canular form, for the paſſage of the breath.

The *q* is never ſounded alone, but in conjunction with *u*, as in *quality*, *queſtion*, *quite*, *quote*, &c. and never ends any Engliſh word.

As a numeral, Q ſtands for 500; and with a daſh over it, thus $\overline{Q}$, for 500,000.

QUACK, among phyſicians, the ſame with empiric. See EMPIRIC.

QUADRA, in building, any ſquare bordure, or frame, encompaſſing a baſſo relievo, pannel, painting, or other work: it is alſo uſed, but erroneouſly, for a frame or bordure, of any other form, as round, oval, or the like.

QUADRAGESIMA, a denomination given to Lent, from its conſiſting of forty days. See the article LENT.

Hence, alſo, the firſt Sunday of Lent is called Quadrageſima-Sunday, and the three preceding Sundays, Quinquageſima, Sexageſima, and Septuageſima.

QUADRANGLE, in geometry, the ſame with a quadrilateral figure, or one conſiſting of four ſides and four angles. See QUADRILATERAL.

QUADRANS, the quarter or fourth part of any thing, particularly the *as*, or pound. See the article AS.

QUADRANT, *Quadrans*, in geometry, an arch of a circle, containing 90°, or the fourth part of the entire periphery. See the articles CIRCLE and DEGREE.

Sometimes alſo the ſpace, or area, included between this arch and two radii drawn from the center to each extremity thereof, is called a quadrant, or, more properly, a quadrantal ſpace, as being a quarter of an entire circle.

QUADRANT, alſo denotes a mathematical inſtrument, of great uſe in aſtronomy and navigation, for taking the altitudes of the ſun and ſtars, as alſo for taking angles in ſurveying, &c.

This inſtrument is variouſly contrived, and furniſhed with different apparatus, according to the various uſes it is intended for; but they all have this in

in common, that they consist of a quarter of a circle, whose limb is divided into 90°. Some have a plummet suspended from the center, and are furnished with sights to look through.

The principal and most useful quadrants are the common surveying quadrant, astronomical quadrant, Adams's quadrant, Cole's quadrant, Davis's quadrant, Gunter's quadrant, Hadley's quadrant, horodictical quadrant, Sutton's or Collins's quadrant, and the senical quadrant, &c.

Gunter's QUADRANT, so called from its inventor Edmund Gunter, is represented in plate LXXVII. fig. 13; and besides the apparatus of other quadrants, has a stereographical projection of the sphere on the plane of the equinoctial. It has also a calendar of the months, next to the divisions of the limb.

Use of Gunter's quadrant. 1. To find the sun's meridian altitude for any given day, or the day of the month for any given meridian altitude. Lay the thread to the day of the month in the scale next the limb; and the degree it cuts in the limb, is the sun's meridian altitude. Thus the thread, being laid on the 15th of May, cuts 59° 30′, the altitude sought; and contrarily the thread, being set to the meridian altitude, shews the day of the month. 2. To find the hour of the day. Having put the bead, which slides on the thread, to the sun's place in the ecliptic, observe the sun's altitude by the quadrant; then, if the thread be laid over the same in the limb, the bead will fall upon the hour required. Thus suppose on the 10th of April, the sun being then in the beginning of Taurus, I observe the sun's altitude by the quadrant to be 36°; I place the bead to the beginning of Taurus in the ecliptic, and lay the thread over 36° of the limb; and find the bead to fall on the hour-line marked 3 and 9; accordingly the hour is either 9 in the morning, or 3 in the afternoon. Again, laying the bead on the hour given, having first rectified, or put it to the sun's place, the degree cut by the thread on the limb gives the altitude. Note, the bead may be rectified otherwise, by bringing the thread to the day of the month, and the bead to the hour-line of 12. 3. To find the sun's declination from his place given, and contrariwise. Set the bead to the sun's place in the ecliptic, move the thread to the line of declination ET, and the bead will cut the degree of declination required. Contrarily, the bead being adjusted to a given declination, and the thread moved to the ecliptic, the bead will cut the sun's place. 4. The sun's place being given, to find his right ascension, or contrarily. Lay the thread on the sun's place in the ecliptic, and the degree it cuts on the limb is the right ascension sought. Contrarily, laying the thread on the right ascension, it cuts the sun's place in the ecliptic. 5. The sun's altitude being given, to find his azimuth, and contrariwise. Rectify the bead for the time, as in the second article, and observe the sun's altitude; bring the thread to the complement of that altitude; thus the bead will give the azimuth sought, among the azimuth lines. 6. To find the hour of the night from some of the five stars laid down on the quadrant. 1. Put the bead to the star you would observe, and find how many hours it is off the meridian, by article 2. Then, from the right ascension of the star subtract the sun's right ascension converted into hours, and mark the difference; which difference, added to the observed hour of the star from the meridian, shews how many hours the sun is gone from the meridian, which is the hour of the night. Suppose on the 15th of May the sun is in the 4th degree of gemini, I set the bead to arcturus; and, observing his altitude, find him to be in the West about 52° high, and the bead to fall on the hour-line of 2 in the afternoon; then will the hour be 11 hours 50 min. past noon, or 10 min. short of midnight: for 62°, the sun's right ascension, converted into time, make 4 hours 8 min. which subtracted from 13 hours 58 min. the right ascension of arcturus, the remainder will be 9 hours 50 min. which added to 2 hours, the observed distance of arcturus from the meridian, shews the hour of the night to be 11 hours 50 minntes.

Hadley's QUADRANT, (plate LXXVII. fig 14.) so called from its inventor J. Hadley, Esq; consists of the following particulars: 1. An octant, or $\frac{1}{8}$ part of a circle, ABC. 2. An index D. 3. The speculum E. 4. Two horizontal glasses, F, G. 5. Two screens, K, K. 6. Two sight-vanes, H, I.

The octant consists of two radii, AB, AC, which are strengthened by the braces LM, and the arch BC; which though containing only 45°, is nevertheless, divided into 90 primary divisions, each of which stands for degrees, and are numbered, 0, 10, 20, 30, &c. to 90; beginning at each end of the arch for the convenience of numbering both ways, either for altitudes or zenith-distances: again each degree is subdivided into minutes.

The index D, is a flat bar, moveable round the center of the instrument; and that part of it which slides over the graduated arch, BC, is open in the middle, with Vernier's scale on the lower part of it; and underneath is a screw, serving to fasten the index against any division.

The speculum E, is a piece of flat glass, quick-silvered on one side, set in a brass-box, and placed perpendicular to the plane of the instrument, the middle part of the former coinciding with the center of the latter. And, because the speculum is fixed to the index, the position of it will be altered by the moving of the index along the arch. The rays of an observed object are received on the speculum, and from thence reflected on one of the horizon-glasses, F, G; which are two small pieces of looking-glass placed on one of the limbs, their faces being turned obliquely to the speculum, from whence

whence they revive the reflected rays of observed objects. This glass, F, has only its lower part quicksilvered, and set in brass-work; the upper part being left transparent to view the horizon. The glass G has in its middle a transparent slit, through which the horizon is to be seen. And because the warping of the wood-work, and other accidents, may distend them from their true situation, there are three screws passing through their feet, whereby they may be easily replaced.

The screens are two pieces of coloured glass, set-in two square brass-frames K, K, which serve as screens to take of the glare of the sun's rays, which would be otherwise too strong for the eye; the one is tinged much deeper than the other, and, as both of them move on the same center, they may be both or either of them used: in the situation they appear in the figure, they serve for the horizon-glass F; but, when they are wanted for the horizon-glass G, they must be taken from their present situation, and placed on the quadrant above G.

The sight-vanes are two pins, H and I, standing at right angles to the plane of the instrument; that at H has one hole in it, opposite to the transparent slit in the horizon-glass G; the other, at I, has two holes in it, the one opposite to the middle of the transparent part of the horizon-glass F, the other rather lower than the quicksilvered part: this vane has a piece of brass on the back of it, which moves round a center, and serves to cover either of the holes.

There are two sorts of observations to be made with this instrument; the one, when the back of the observer is turned towards the object, and therefore called the back-observation; the other, when the face of the observer is turned towards the object, which is called the fore-observation.

To rectify the instrument for the fore-observation: slacken the screw in the middle of the handle behind the glass F; bring the index close to the button *b*; hold the instrument in a vertical position, with the arch downwards; look through the right hand hole in the vane I, and through the transparent part of the glass F, for the horizon; and if it lies in the same right line with the image of the horizon, seen on the quicksilvered part, the glass F is rightly adjusted; but, if the two horizon lines disagree, turn the screw at the end of the handle backwards or forwards, until those lines coincide, then fasten the middle screw of the handle, and the glass is rightly adjusted.

To take the sun's altitude by the fore-observation: having fixed the screens above the horizon-glass F, and suited them proportionally to the strength of the sun's rays, turn your face towards the sun, holding the instrument with your right hand, by the braces L, M, in a vertical position, with the arch downwards; put your eye close to the right hand hole in the vane I, and view the horizon through the transparent part of the horizon-glass, F, moving at the same time the index D, with your left hand, till the reflex solar spot coincides with the line of the horizon; then the degrees counted from C, or that end next your body, will give the altitude of the sun at that time, observing to add or subtract 16 min. according as the upper or lower edge of the sun's reflex image is made use of. But to obtain the sun's meridian altitude, which is the thing wanted, in order to find the latitude; the observations must be continued, and, as the sun approaches the meridian, the index D must be continually moved towards B, in order to maintain the coincidence between the reflex solar spot and the horizon; and consequently, as long as this motion can maintain the same coincidence, the observation must be continued, and when the sun has attained the meridian, and begins to descend, the coincidence will require a retrograde motion of the index, or towards C; and then is the observation finished, and the degrees counted, as before, will give the sun's meridian altitude, or those from B, the zenith distance; observing to add $16' = \text{semidiam.}\ \odot$, if the sun's lower edge is brought to the horizon; or to subtract $16'$, when the horizon and upper edge coincide.

To take the altitude of a star by the fore-observation: through the vane H, and the transparent slit in the glass G, look directly to the star; and at the same time move the index, till the image of the horizon behind you being reflected by the great speculum, is seen in the quick-silvered part of G, and meets the star; then will the index shew the degrees of the star's altitude.

To rectify the instrument for the back-observation: slacken the screw in the middle of the handle, behind the glass G; turn the button *b* on one side, and bring the index as many degrees before *o*, as is twice the dip of the horizon at your height above the water; hold the instrument vertical with the arch downwards, look through the hole of the vane H, and if the horizon seen through the transparent slit in the glass G, coincides with the image of the horizon, seen in the quick-silvered part of the same glass; then the glass G is in its proper position. But, if not, set it by the handle, and fasten the screw as before.

To take the sun's altitude by the back-observation: put the stem of the screens K, K, into the the hole *r*, and, in proportion to the strength or faintness of the sun's rays, let one, both, or neither of the frames of those glasses be turned close to the face of the limb; hold the instrument in a vertical position, with the arch downwards, by the braces L, M, with your left hand; turn your back towards the sun, and put your eye close to the hole, in the vane H, observing the horizon through the transparent slit in the horizon-glass G; with your right hand move the index D, till the reflected image of

the ſun be ſeen in the quick-ſilvered part of the glaſs G, and in a right line with the horizon; ſwing your body to and fro, and if the obſervation be well made, the ſun's image will be obſerved to bruſh the horizon, and the degrees reckoned from C, or that part of the arch fartheſt from your body, will give the ſun's altitude, at the time of obſervation; obſerving to add 16 min. = the ſun's ſemidiameter, if the ſun's upper edge be uſed; and ſubtract 16 min. from the altitude, if the obſervation reſpected the lower edge.

The directions here given, eſpecially if joined with thoſe delivered under the article LATITUDE, (which ſee) for taking of altitudes at ſea, would be ſufficient, were there not two corrections neceſſary to be made, before the altitude can be accurately aſſigned, viz. one on account of the obſerver's eye being raiſed above the level of the ſea, and the other on account of the refraction occaſioned in ſmall altitudes, by the hazineſs of the atmoſphere.

We ſhall therefore give a table, ſhewing the corrections neceſſary to be made to altitudes on both theſe accounts, whether it be taken by Davis's or Hadley's quadrant, or any other inſtrument.

Height of the eye in feet.	Corrections in minutes.	Altitude in degrees.	Corrections in minutes.	Altitude in degrees.	Corrections in minutes.
5	2′	1	23′	12	4′
10	3′	2	17½′	15	3½′
15	4′	3	14′	20	2½′
20	5′	4	11′	25	2′
25	5½′	5	9′	30	1½′
30	6′	6	8′	35	1⅓′
35	6½′	7	7′	40	1′
40	7′	8	6′	50	0¾′
45	7½′	9	5½′	60	0½′
50	8′	10	5′	70	0¼′

General rules for uſing this table of corrections: 1. In the fore-obſervations, add the ſum of the corrections to the obſerved zenith-diſtance, for the true zenith-diſtance; or, take the ſum of the corrections from the obſerved altitude, and the remainder will be the altitude. 2. In the back-obſervations, add the dips, or corrections for the height of the eye, and ſubtract the refractions, for altitudes; and for zenith diſtances, ſubtract the dips, and add the refractions.

Example: By a back-obſervation, the altitude of the ſun's lower edge was found by Hadley's quadrant to be 25° 12′; the eye being 30 feet above the horizon. By the table, the dip on 30 feet is 6, and the refraction on 25° is 2′; therefore 25° 12′ — 16′ (= ſemidiam. ⊙) = 24° 56′ and 24° 56′ + 6′ (by rule 2.) = 25° 2′; and laſtly, 25° 2′ — 2′ (by rule 2.) = 25° = the true or corrected altitude.

We have been the more particular in our deſcription and uſe of Hadley's quadrant, as it is undoubtedly the beſt hitherto invented.

QUADRANT *of Altitude*, is an appendage of the artificial globe, conſiſting of a lamina, or ſlip of braſs, the length of a quadrant of one of the great circles of the globe and graduated. At the end, where the diviſion terminates, is a nut riveted on, and furniſhed with a ſcrew, by means whereof the inſtrument is fitted on to the meridian, and moveable round upon the rivet, to all points of the horizon.

Its uſe is to ſerve as a ſcale in meaſuring altitudes, amplitudes, azimuths, &c. See GLOBE.

QUADRANTAL, in Roman antiquity, a veſſel every way ſquare like a die, ſerving as a meaſure of liquids: its capacity was eighty libræ or pounds of water, which made forty-eight ſextaries, two urnæ, or eight congii.

QUADRANTAL TRIANGLE, a ſpherical triangle, one of whoſe ſides at leaſt is a quadrant of a circle, and one of its angles a right-angle. See the article TRIANGLE.

QUADRAT, *Quadratum*, a mathematical inſtrument, called alſo a geometrical ſquare, and line of ſhadows: it is frequently an additional member on the face of the common quadrant, as alſo on thoſe of Gunter's and Sutton's quadrants.

QUADRAT, in aſtrology, the ſame with quartile. See QUARTILE.

QUADRAT, in printing, a piece of metal caſt like the letters, to fill up the void ſpaces between words, &c.

There are quadrats of different ſizes, as *m* quadrats, *n* quadrats, &c. which are reſpectively of the dimenſions of theſe letters.

QUADRATA LEGIO, a ſquare legion, in Roman antiquity, one conſiſting of four thouſand men. See LEGION.

QUADRATIC EQUATION, in algebra, that wherein the unknown equality is of two dimenſions, or raiſed to the ſecond power. See EQUATION and POWER.

Conſtruction of QUADRATIC EQUATIONS. See CONSTRUCTION.

QUADRATING *of a Piece*, among gunners, is the due placing of a piece of ordnance, and poiſing it in its carriage, and having its wheels of an equal height, &c. See the article GUNNERY.

QUADRATO-CUBUS, *Quadrato-Quadrato-Cubus*, and *Quadrato-Cubo-Cubus*, according to Diophantus, Vieta, Oughtred, &c. denotes the fifth, ſeventh, and eighth powers. See POWER.

QUADRATO-*Quadratum*, or *Biquadratum*, the fourth power of numbers, or the product of the cube when multiplied by the root.

QUADRATRIX, in geometry, a mechanical line, by means whereof we can find right-lines equal to the circumference of circles, or other curves, and their ſeveral parts.

QUADRATRIX *of Dinoſtrates*, ſo called from its inventor Dinoſtrates, is a curve, whereby the quadrature of the circle is effected mechanically.

QUADRATRIX *Tſchirnhauſiana*, is a tranſcendental curve invented by M. Tſchirnhauſen, whereby the quadrature of the circle is likewiſe effected.

QUADRATUM-CUBI, *Quadrato-Quadrato-Quadratum*, and *Quadratum-Surdeſolidi*, according to the Arabs, denote the ſixth, eighth, and tenth powers of numbers. See the article POWER.

QUADRATURE, *Quadratura*, in geometry, denotes the ſquaring, or reducing a figure to a ſquare. Thus, the finding of a ſquare, which ſhall contain juſt as much ſurface or area as a circle, an ellipſis, a triangle, &c. is the quadrature of a circle, ellipſis, &c.

QUADRATURE, in aſtronomy, that aſpect of the moon when ſhe is 90° diſtant from the ſun; or when ſhe is in a middle point of her orbit, between the points of conjunction and oppoſition, namely, in the firſt and third quarters. See MOON.

QUADRATURE-*Lines*, are two lines placed on Gunter's ſector: they are marked with Q. and 5, 6, 7, 8, 9, 10; of which Q. ſignifies the ſide of the ſquare, and the other figures the ſides of polygons of 5, 6, 7, &c. ſides. S. on the ſame inſtrument, ſtands for the ſemi-diameter of a circle, and 90 for a line equal to 90° in circumference.

QUADRATUS, in anatomy, a name given to ſeveral muſcles on account of their ſquare figure.

QUADREL, in building, a kind of artificial ſtone, ſo called from its being perfectly ſquare.

The quadrels are made of a chalky earth, &c. and dried in the ſhade for two years. Theſe were formerly in great requeſt among the Italian architects.

QUADRILATERAL, in geometry, a figure whoſe perimeter conſiſts of four right-lines, making four angles; whence it is alſo called a quadrangular figure.

The quadrilateral figures are either a parallelogram, trapezium, rectangle, ſquare, rhombus, or rhomboides.

QUADRIL, *Quadrilla*, a little troop or company of caviliers, pompouſly dreſſed, and mounted for the performance of carouſals, juſts, tournaments, runnings at the ring, and other gallant divertiſements.

QUADRILLE, a game at cards, ſometimes called ombre by four; which chiefly differs from ombre by three, in being played by four perſons, and having all the forty cards dealt out, to each perſon, at ten each. See OMBRE.

QUADRUPEDS, *Quadrupedia*, in zoology, a claſs of land-animals, with hairy bodies, and four limbs or legs proceeding from the trunk of their bodies: add to this, that the females of this claſs are viviparous, or bring fourth their young alive, and nouriſh them with milk from their teats.

QUADRUPLE, a ſum or number multiplied by four, or taken four times.

This word is particularly uſed for a gold coin, worth four times as much as that whereof it is the quadruple.

QUAKERS, a religious ſect, which made its firſt appearance in England during the interregnum; ſo called, in deriſion, from certain unuſual tremblings with which they were ſeized at their firſt meetings.

Their founder was George Fox, a ſhoe-maker, born at Draiton, in Leiceſterſhire; who, as he worked at his trade, uſed to meditate much on the Scriptures: at length he began to ſee viſions, and ſet up for a preacher.

He propoſed but few articles of faith, inſiſting chiefly on moral virtue, mutual charity, the love of God, and a deep attention to the inward motions and ſecret operations of the ſpirit. He required a plain ſimple worſhip, and a religion without ceremonies, making it a principal point to wait in profound ſilence the directions of the Holy Spirit.

Quakers were at firſt guilty of ſome extravagancies, but theſe wore off, and they ſettled into a regular body, profeſſing great auſterity of behaviour, a ſingular probity and uprightneſs in their dealings, a great frugality at their tables, and a remarkable plainneſs and ſimplicity in their dreſs.

The ſyſtem of the Quakers is laid down in fifteen theſes, by Robert Barclay, in a ſenſible well-wrote apology, addreſſed to Charles II.

Their principal doctrines are, That God has given to all men, without exception, ſupernatural light, which, being obeyed, can ſave them; and that this light is Chriſt, the true light, which lighteth every man that cometh into the world. That the Scriptures were indeed given by inſpiration, and are preferable to all the other writings in the world; but that they are no more than ſecondary rules of faith and practice, in ſubordination to the light or ſpirit of God, which is the primary rule. That immediate revelation is not ceaſed, a meaſure of the ſpirit being given to every one. That all ſuperſtitions and ceremonies in religion, of mere human inſtitution, ought to be laid aſide; as alſo, in civil ſociety, the ſaluting one another by pulling off the hat, bowing, or the like; and the ſaying *you*, inſtead of *thou*, to a ſingle perſon. That men and women ought to be plain and grave in their apparel, ſober and juſt in their whole converſation, and, at a word, in all their dealings; and not to ſwear, to go to war, to fight in private quarrels, or even to bear any carnal weapons.

They alſo entirely ſet aſide the two ſacraments, baptiſm, and the Lord's-ſupper; admit no clergy among them, but any one, without diſtinction, who

who is of a ſober life, and believes him or herſelf to be moved thereto by the Spirit, is allowed to preach in their aſſemblies; and they hold it unlawful to pay tythes, or church-rates. In ſhort, they are a quiet inoffenſive people, of exemplary morals, remarkably charitable and friendly to each other, and have never yet been guilty of perſecution, though they have had it in their power.

As to the diſcipline and polity, the affairs of the community are managed in their aſſemblies, of which there are ſeveral kinds; as monthly, quarterly, yearly, ſecond day's meetings, and meetings of ſufferings. The monthly and quarterly meetings are held in their reſpective counties, to which deputies are ſent from the ſeveral particular meetings, and enquiry is made into the ſtate of each meeting; who violate the laws of the community; who pay tythes or church-rates, and who ſuffer for the non-payment of either: here too they excommunicate, and receive again into their communion. Of all which regiſters are kept.

From theſe meetings appeals lie to their yearly aſſemblies, which are always held in London, and conſiſt of three orders or claſſes; repreſentatives ſent from the quarterly meetings, correſpondents from foreign countries and the ſeveral counties, and preachers. Hither are tranſmitted accounts of what has been tranſacted in all the monthly and quarterly meetings: here meaſures are concerted, and directions given as to behaviour about tythes, rates, &c. and here they compoſe differences and make proviſions for the poor: here public accounts are audited, and inſtructions given to the deputies to be obſerved at their return; and from hence a yearly epiſtle of admonition is diſpatched, to be read in all the monthly and quarterly meetings.

The ſecond day's meeting is a ſtanding committee, conſiſting of the principal preachers in and about the city, who meet every Monday to conſider of particular caſes and exigencies which happen between the yearly meetings.

The meeting of ſufferings is held every week, and conſiſts of the correſpondents for each county. Its buſineſs is to receive complaints from ſuch as have ſuffered for non-payment of tythes and church-rates, and to procure them relief, either by ſending them money, for which they have a ſettled fund, or by ſoliciting their cauſe, or both.

QUALIFICATOR, in the canon-law, a divine appointed to qualify, or declare the quality of a propoſition brought before an eccleſiaſtical tribunal, chiefly before the inquiſition. The qualificators of the office are not judges, they only give their ſentiments on the propoſition preſented to them.

QUALITY, *Qualitas*, is defined by Mr. Locke, to be the power in a ſubject of producing any idea in the mind: thus a ſnow-ball having the power to produce in us the ideas of white, cold, and round, theſe powers, as they are in the ſnow-ball, he calls qualities; and as they are ſenſations, or perceptions, in our underſtanding, he calls ideas. See the article Idea.

QUANTITY, *Quantitas*, any thing capable of eſtimation, or menſuration; or which, being compared with another thing of the ſame kind, may be ſaid to be greater or leſs than it, equal or unequal to it.

Mathematics is the ſcience or doctrine of quantity, which being made up of parts, is capable of being made greater or leſs. It is increaſed by addition, and diminiſhed by ſubtraction; which are therefore the two primary operations that relate to quantity. Hence it is ſaid that any quantity may be ſuppoſed to enter into algebraic computations two different ways, which have contrary effects, viz. either as an increment or as a decrement. See the articles Addition and Subtraction.

As addition and ſubtraction are oppoſite, or an increment is oppoſite to a decrement, there is an analogous oppoſition between the affections of quantities that are conſidered in the mathematical ſciences; as between exceſs and defect, between the value of effects or money due to a man, and money due by him; a line drawn towards the right, and a line drawn towards the left; gravity, and levity; elevation above the horizon, and depreſſion below it. When two quantities equal in reſpect of magnitude, but of thoſe oppoſite kinds, are joined together, and conceived to take place in the ſame ſubject, they deſtroy each other's effect, and their amount is nothing. A power is ſuſtained by an equal power, acting on the ſame body with a contrary direction, and neither have effect. When two unequal quantities of thoſe oppoſite qualities are joined in the ſame ſubject, the greater prevails by their difference; and when a greater quantity is taken from a leſs of the ſame kind, the remainder becomes of the oppoſite kind. When two powers or forces are to be added together, their ſum acts upon the body; but when we are to ſubtract one of them from the other, we conceive that which is to be ſubtracted, to be a power with an oppoſite direction; and if it be greater than the other, it will prevail by the difference. This change of quality only takes place where the quantity is of ſuch a nature as to admit of ſuch a contrariety or oppoſition. We know nothing analogous to it in quantity abſtractedly conſidered; and cannot ſubtract a greater quantity of matter from a leſſer, or a greater quantity of light from a leſſer; and the application of this doctrine to any art or ſcience, is to be derived from the known principles of the ſcience. See the articles Algebra, Geometry, &c.

A quantity that is to be added, is called a poſitive quantity; and a quantity to be ſubtracted, is ſaid to be negative. See the articles Positive and Negative.

Quan-

Quantities are ſaid to be like or ſimilar, that are of the ſame denomination, or are repreſented by the ſame letter or letters, equally repeated: but quantities of different denominations, or repreſented by a different letter or letters, are ſaid to be unlike or diſſimilar. A quantity conſiſting of more than one term, is called a compound quantity; whereas that conſiſting of one term only, is denominated a ſimple quantity.

The quantity of matter in any body, is the product of its denſity into its bulk; or a quantity ariſing from the joint conſideration of its magnitude and denſity; as if a body be twice as denſe, and take up twice as much ſpace as another, it will be four times as great. This quantity of matter is beſt diſcoverable by the abſolute weight of bodies. See GRAVITY.

The quantity of motion in any body is the factum of the velocity into the maſs, or it is a meaſure ariſing from the joint conſideration of the quantity of matter, and the velocity of the motion of a body; the motion of any whole being the ſum or aggregate of the motion in all its ſeveral parts. Hence, in a body twice as great as another, moved with an equal velocity, the quantity of motion is double; if the velocity be double alſo, the quantity of motion will be quadruple. Hence, the quantity of motion is the ſame with what we call the momentum or impetus of a moving body. See the article MOTION.

QUANTITY, in grammar, an affection of a ſyllable, whereby its meaſure, or the time wherein it is produced, is aſcertained; or that which determines the ſyllable to be long or ſhort. See the articles MEASURE and SYLLABLE.

Quantity is alſo the object of proſody, and diſtinguiſhes verſe from proſe; and the œconomy and arrangement of quantities, that is, the diſtribution of long and ſhort ſyllables, makes what we call the number.

Combination of QUANTITIES. See the article COMBINATION.

Commenſurable QUANTITIES. See the article COMMENSURABLE.

Exponential QUANTITY. See the article EXPONENTIAL.

Infinite QUANTITIES. See the articles INFINITE QUANTITIES, and INFINITESIMALS.

QUANTUM MERUIT, in law, is an action upon the caſe, founded on the neceſſity of paying a perſon, for doing any thing, as much as he deſerves.

QUARANTAIN, QUARENTINE, or QUARANTENA, in old law books, denotes the ſpace of forty days. It alſo ſignifies a benefit allowed to the widow of a man dying ſeiſed of lands, &c. by which ſhe may challenge to continue in his capital meſſuage, or chief manſion houſe, ſo it be not a caſtle, for the ſpace of forty days after his deceaſe. And if the heir or any other perſon eject her, ſhe may have the writ de quarantena habenda.

QUARANTAIN is more particularly uſed for a term of forty days, which veſſels, coming from places ſuſpected of contagion, are obliged to wait in certain places appointed to air themſelves, before they come into port. See the article LAZAR-HOUSE.

Quarantain, alſo ſignifies a meaſure or extent of land, containing forty perches.

QUARANTAIN *of the King*, in France, denotes a truce of forty days, appointed by St. Louis, during which it was expreſly forbid to take revenge on the relations or friends of people, who had fought, wounded, or affronted each other in words.

QUARREL, *Querela*, in law, is generally applied to perſonal and mixed actions, in which the plaintiff is called querens: and hence it is that if a perſon releaſe all quarrels, it is taken to be as beneficial to the releaſee, as if it were a releaſe of all actions; ſince all actions, both real and perſonal, are thereby releaſed.

QUARREL *of Glaſs*. See the next article.

QUARRY, a place under ground, out of which are got marble, free-ſtone, ſlate, lime-ſtone, or other matters proper for buildings.

Quarries of free-ſtone, are in many places opened, and the ſtone brought out, in the following manner: they firſt dig a hole in the manner of a well, twelve or fourteen feet in diameter, and the rubbiſh drawn out with a windlaſs in large oſier baſkets, they heap up all around; placing their wheel, which is to draw up their ſtones, upon it. As the hole advances, and the common ladder becomes too ſhort, they apply a particular ladder for the purpoſe. When they have got through the earth, and are arrived at the firſt bank or ſtratum, they begin to apply their wheel and baſkets to diſcharge the ſtones as faſt as they dig through them. In freeing the ſtone from the bed, they proceed thus: as common ſtones, at leaſt the ſofter kinds, have two grains, a cleaving grain, running parallel with the horizon, and a breaking grain, running perpendicular thereto; they obſerve by the grain where it will cleave, and there drive in a number of wedges, till they have cleft it from the reſt of the rock. This done, they proceed to break it; in order to which, applying the ruler to it, they ſtrike a line, and by this cut a little channel with their ſtone-ax; and in the channel, if the ſtone be three or four feet long, ſet five or ſix wedges, driving them in very carefully with gentle blows, and ſtill keeping them equally forward. Having thus broken the ſtone in length, which they are able to do of any ſize within half an inch, they apply a ſquare to the ſtraight ſide, ſtrike a line, and proceed to break it in breadth. This way of managing ſtone is found vaſtly preferable to that where they are broken at random; one load of the former being found to do the buſineſs of a load

and a half of the latter. But it may be obſerved, that this cleaving grain being generally wanting in the harder kinds of ſtones, to break up theſe in the quarries, they have great heavy ſtone-axes, with which they work down a deep channel into the ſtone; and into this channel, at the top, lay two iron bars, between which they drive their iron wedges.

Some in dividing the ſtone, eſpecially the very hard kinds, make uſe of gun-powder, with very good effect. In order to which, making a ſmall perforation pretty deep in the body of the rock, ſo as to have that thickneſs of rock over it judged proper to be blown up at once, at the further end of the perforation they diſpoſe a convenient quantity of gunpowder, filling up all the reſt with ſtones and rubbiſh, ſtrongly rammed in, except a ſmall place for the train. By this means is the rock blown into ſeveral pieces, moſt of which are not too big to be managed by the workmen.

QUARRY, or QUARREL, among glaziers, a pane of glaſs cut in a diamond form.

Quarries are of two kinds, ſquare and long, each of which are of different ſizes, expreſſed by the number of the pieces that make a foot of glaſs, viz. eighths, tenths, twelfths, eighteenths, and twentieths:

QUARRY, in falconry, is the game which the hawk is in purſuit of, or has killed.

QUART, a meaſure containing the fourth part of ſome other meaſure. See the article MEASURE.

The Engliſh quart is the fourth part of a gallon, or two pints. See the articles GALLON and PINT.

QUARTAN, *Quartana*, in medicine, a ſpecies of intermitting fever, wherein the patient has two fits in four days, or two days quite free from a fit.

It uſually begins about four or five in the afternoon, ſometimes ſooner and ſometimes later, with a great laſſitude, ſtretching, a blunt pain in the head, back, loins, and legs; the feet and hands are cold, and the whole body is pale; and the face and nails livid, to which ſhivering and ſhaking ſupervene. The tongue and the lips tremble, the breathing is difficult, with reſtleſſneſs, and toſſing; the pulſe is contracted and hard, and ſometimes unequal; and there is an anxiety about the præcordia. Theſe ſymptoms continue about two or three hours; and in ſome the body is coſtive, whereas in others there is a ſtimulus to ſtool, and to make water; in ſome again, there is a nauſea or vomiting, with ſtools; and ſome advanced in years, have their minds pretty much diſturbed. The heat comes on gradually, not burning but dry; the pulſe becomes equal, quick, and large, but the dull pain in the head remains, with a vertiginous affection; the ſkin becomes only a little moiſt; and in about four or ſix hours, the ſymptoms vaniſh except a dull pain in the bones, joints, and feet. The urine in the fit is ſometimes thin and watery, and ſometimes thick with a ſediment.

From the experiments of Dr. Langriſh it appears, that the blood is more denſe and tenacious in quotidians than in tertians, and in tertians than in quartans. See QUOTIDIAN and TERTIAN.

As to the cure, a vomit ſhould be given after the firſt fit, in the time of intermiſſion: in tender conſtitutions, ipecacuanha may be given alone, or two ounces of vinum ipecacuanhum; but to the robuſt, a grain or two of emetic tartar may be added, to be taken in warm water about two hours after the paroxyſm. The evacuation ſhould be facilitated by taking large draughts of water-gruel made fat with freſh butter. Then take the following electuary, which will cruſh the diſeaſe in the bud: viz. take of rob of elder, one ounce; of peruvian bark, five drams; of the powder of common chammomile-flowers, two drams; of the extract of leſſer centaury, and powder of clove-julyflowers, each half a dram; and as much ſyrup of lemons as is ſufficient to reduce them to the form of an electuary. The doſe is half a dram, to be taken every two hours after the fit.

If any thing forbids vomiting, the cure muſt be begun with deterſive and aperient ſalts, as vitriolated tartar, ſalt ammoniac, purified nitre, and crab's eyes; and if the ague ſtill continue, notwithſtanding the repeated uſe of theſe ſalts, then an equal weight of peruvian bark muſt be added to them, or the above electuary may be given.

When the patient is ſubject to the hypochondriac paſſion, the ſtomach is inflated, and the body coſtive; then neither vomits nor ſalts muſt be ventured upon, but carminitive and emollient clyſters.

In obſtinate quartans, Hoffman greatly commends the following medicine: take of peruvian bark, three drams; of medicinal regulus of antimony, two drams; of mercurius dulcis, (which is not to be triturated with the powder on account of the ſalts, but only mixed with the point of a knife) of the fineſt crocus martis, and of vitriolated nitre, each one dram: and of oil of mint, four drops: make up all theſe into a powder, of which half a dram, or a dram, may be taken, made into the form of a bolus, with rob of elder, and ſyrup of clove-julyflowers.

This method is confirmed by Huxam, who ſays the bark frequently proves ineffectual, without the help of proper alexipharmacs; as ſnake-root of Virginia, contrayerva, myrrh, camphor &c. After four or five paroxyſms, warm chalybeates may be added with very great ſucceſs; but when the patient's complexion has a yellow caſt, and he has a tenſe abdomen, and a very coſtive habit of body, mercurial, ſaponaceous deobſtruents, with rhubarb, aloetics, or ſal diureticus ſhould be premiſed to, or joined with the bark. Hoffman obſerves, that ob-

obſtinate quartans in boys are not to be cured but by purging; and therefore, he directs the following form: take of cream of tartar, one dram; of calx of antimony, twelve grains; of ſulphurated diagrydium, ſix grains; make them into a powder, which may be taken in three doſes, the firſt ſix hours before the fit, the ſecond before the next fit, and the third before the third fit. After this, he orders an infuſion of half an ounce of peruvian bark in eight ounces of fennel-water; adding the bark of Eleutherius, ſal diureticus, and ſalt of tartar, of each one dram, together with half an ounce of ſyrup of clove-julyflowers; a ſpoonful of which ſhould be taken every two hours.

To prevent the return of an ague, the bark muſt be repeated every week or ten days, for three ſeveral times, with the ſame intervals. Likewiſe bitters and chalybeates are very ſerviceable, taken either together or ſeparately.

QUARTATION, in metallurgy, a method of purifying gold, by melting three parts of ſilver with one of gold, and then throwing the mixture into aquafortis. See the article ASSAYING.

QUARTER, *Quadrans*, the fourth part of any thing, the fractional expreſſion for which is $\frac{1}{4}$. See the article FRACTION.

QUARTER, in weights, is generally uſed for the fourth part of an hundred weight averdupois, or 28lb. See WEIGHT.

Uſed as the name of a dry meaſure, quarter is the fourth part of a ton in weight, or eight buſhels. See the articles MEASURE and TON.

QUARTER, in law, the fourth part of a year; and hence the days on which theſe quarters commence, are called quarter-days, viz. March 25, or Lady-day; June 24, or Midſummer-day; September 29, or Michaelmas; and December 21, or St. Thomas the apoſtle's day. On theſe days rents on leaſes, &c. are uſually reſerved to be paid; though December 25, or Chriſtmas-day, is commonly reckoned the laſt quarter-day.

QUARTER, in aſtronomy, the fourth part of the moon's period: thus, from the new moon to the quadrature is the firſt quarter; from this to full moon, the ſecond quarter, &c. See PHASIS and MOON.

QUARTER, in heraldry, is applied to the parts or members of the firſt diviſion of a coat that is quartered, or divided into four quarters. See QUATERING.

Franc-QUARTER, in heraldry, is a quarter ſingle or alone; which is to poſſeſs one fourth part of the field.

This makes one of the honourable ordinaries of a coat.

QUARTER *of a Point*, in navigation, is the fourth part of the diſtance between two cardinal points, which is 2° 48′.

QUARTER of a ſhip, is that part of a ſhip's hold, which lies between the ſteerage-room and the tranſom.

Cloſe-QUARTERS, in a ſhip, thoſe places where the ſeamen quarter themſelves, in caſe of boarding, for their own defence, and for clearing the decks, &c.

QUARTER-DECK. See DECK.

QUARTER-MASTERS, or QUARTEERS, in a man of war, are officers whoſe buſineſs is to rummage, ſtow, and trim the ſhip in the hold; to overlook the ſteward in his delivery of victuals to the cook, and in pumping or drawing out beer, or the like. They are alſo to keep their watch duly, in conning the ſhip, or any other duty.

QUARTER, in war, is uſed in various ſenſes, as for the place allotted to a body of troops to encamp upon: thus they ſay, the general has extended his quarters a great way, &c. Quarter alſo ſignifies the ſparing mens lives: thus it is ſaid, the enemy aſked quarter: we gave no quarter.

QUARTER *of an Aſſembly*, is the place of rendezvous, where the troops are to meet and draw up in a body.

Head-QUARTERS, is the place where the general of an army has his quarters, which is generally near the center of the army.

QUARTERS *of Refreſhment*, is the place to which the troops that have been much fatigued are ſent to refreſh themſelves, during a part of the campaign.

Winter-QUARTERS, the places in which the troops are lodged during the winter, or their reſidence in thoſe places.

QUARTER-*Maſter*, an officer in the army, whoſe buſineſs is to look after the quarters of the ſoldiers; of which there are ſeveral kinds, viz. The quarter-maſter general, whoſe buſineſs is to provide good quarters for the whole army. Quarter-maſter of horſe, he who is to provide quarters for a troop of horſe. Quarter-maſter of foot, he who is to provide quarters for a regiment of foot.

QUARTER, in the manege, as to work from quarter to quarter, is to ride a horſe three times in upon the firſt of the four lines of a ſquare; then changing your hand, to ride him three times upon the ſecond; and ſo to third and fourth; always changing hands and obſerving the ſame order.

QUARTER-*Chord*, in mining, is ſeven yards and a quarter, which the miner has croſs-ways of his vein, on either ſide, for liberty to lay his earth, ſtones, and rubbiſh on, and to waſh and dreſs up his ore.

QUARTERS, in building, are thoſe ſlight upright pieces of timber placed between the puncheons and poſts, uſed to lath upon.

Theſe are of two ſorts, ſingle and double; the ſingle quarters are ſawn to two inches thick, and four inches broad; the double quarters are ſawn to four inches ſquare.

It is a rule in carpentry, that no quarters be placed at a greater diſtance than fourteen inches.

QUARTER-*Round*, in archtiecture, is a term uſed by the workmen for any projecting moulding in general, whoſe contour is a perfect quadrant of a circle, or which approaches near that figure.

QUARTER-*Wheeling*, or QUARTER *of Converſion*, in the military art, is the motion by which the front of a body of men is turned round to where the flank was, by taking a quarter of a circle.

If it be done to the right, the man in the right-hand angle keeps his ground and faces about, while the reſt wheel; if to the left, the left-hand man keeps his place.

QUARTER-*Wind*, at ſea, is a lateral or ſide-wind, which does not blow in ſtern, but a little aſide of it.

This is the beſt of all winds, as bearing into all the ſails; whereas a wind blowing full in ſtern, is kept off by the ſails of the mizzen.

QUARTERING, in the ſea-language, is diſpoſing the ſhips company at an engagement, in ſuch a manner as that each may readily know where his ſtation is, and what he is to do.

As ſome to the maſter for the management of the ſails; ſome to aſſiſt the gunners in traverſing the ordnance; ſome for plying of the ſmall ſhot; ſome to fill powder in the powder-room: others to carry it from thence to the gunners, in carthrages, &c.

When a ſhip under ſail goes at large, neither by a wind nor before a wind, but, as it were, betwixt both, ſhe is ſaid to go quartering.

QUARTERING, in gunnery, is when a piece of ordnance is ſo traverſed that it will ſhoot on the ſame line, or on the ſame point of the compaſs as the ſhip's quarter bears.

QUARTERING, in heraldry, is dividing a coat into four or more quarters, or quarterings, by parting, couping, &c. that is, by perpendicular and horizontal lines, &c.

Counter-QUARTERING *a Coat*, is when the quarters are ſubdivided each into four.

There are counter-quartered coats that have twenty or twenty-five quarters.

QUARTERING, or QUARTERIZATION, is part of the puniſhment of a traitor, which conſiſts of dividing his body into four quarters.

QUARTERLY, in heraldry. A perſon is ſaid to bear quarterly, when he bears arms quartered. See QUARTERING.

QUARTERN, a diminutive of quart, ſignifying a quarter of a pint.

QUARTILE, an aſpect of the planets. See ASPECT.

QUARTO, or 4to, a book of which four leaves, or eight pages, make a ſheet.

QUARTO-DECIMANS, *Quarto-decimani*, an antient Chriſtian ſect, ſo called from their maintaining that the feſtival of Eaſter ought to be celebrated, conformably to the cuſtom of the Jews, on the fourteenth day of the moon in the month of March, whatever day of the month that happened to be.

QUASHING, in law, the overthrowing or annulling of any thing.

QUASSIA, in botany, a genus of decandrious plants, whoſe flower conſiſts of five lanceolated, long, ſeſſile petals, with five ovate, hairy, ſquamous nectariums: there are five pericarpiums inſerted into an orbicular fleſhy receptacle, and the ſeeds are ſolitary and globoſe.

QUARTER-COUSINS, fourth couſins, or the laſt degree of kindred.

QUAVER, in muſic, a meaſure of time equal to half a crochet, or an eighth of a ſemibreve.

The quaver is divided into two ſemiquavers, and four demiſemiquavers. See CHARACTERS *in Muſic*.

QUAVERING. in muſic, trilling or ſhaking; or the running a diviſion with the voice.

QUAY, or KAY. See WHARF.

QUEEN, *Regina*, a woman who holds a crown ſingly.

The title of Queen is alſo given by way of courteſy to her that is married to a king, who is called by way of diſtinction queen conſort; the former being termed queen regent. The widow of a king is alſo called queen; but with the addition of dowager.

QUERCUS, the oak-tree, in botany. See the article OAK.

QUERIA, in botany, a genus of plants, whoſe flower hath no corolla; the calyx is erect and perſiſtent, and divided into five oblong acute ſegments; the outward ones are recurved; the ſtamina are three ſhort hairy filaments, topped with roundiſh antheræ. The fruit is a roundiſh trivalvular capſule, with one cell containing a ſingle ſeed.

QUESTION, *Quæſtio*, in logic, a propoſition propoſed by way of interrogation. See the article PROPOSITION.

QUESTOR, or QUÆSTOR, in Roman antiquity, an officer who had the management of the public treaſure.

QUEUE, in heraldry, ſignifies the tail of a beaſt: thus if a lion be borne with a forked tail, he is blazoned double queued.

QUEUE D'ARONDE, or SWALLOW'S TAIL, in fortification, an outwork which is narrower at the gorge than at the front or face, being ſo called from its reſemblance to a ſwallow's tail.

Of this kind are ſome ſingle as well as double tenailles, and ſome horn-works whoſe ſides are not parallel. See the articles TENAILE and HORN-WORK.

When the front is narrower than the gorge, the work is denominated a contre queue d'aronde.

In

In carpentry, a que d'aronde is more generally known by the name of dove-tail. See DOVE-TAIL.

QUICK, or QUICKSET, among gardeners, the hawthorn, or mespilus sylvestris, much used for hedges, it being very proper for that purpose. In the choice of quick, those which are raised from seeds in the nursery are preferable to such as are drawn from the woods, the latter seldom arising with good roots; but to have the best quick fence, it is most eligible to sow the haws where the hedge is intended; for these unremoved plants will make a much stronger and more durable fence than those which are transplanted; but they should be properly weeded when young, and protected from being injured by cattle, &c. When quick is grown rude, and bare at bottom, it may be necessary to plash it; of which method there are two extremes to be avoided; the first is, laying it too low and too thick; because it makes the sap run all into the shoots, and leaves the plashes without nourishment, which, with the thickness of the hedge, kill them: secondly, it must not be laid too high, because this draws all the sap into the plashes, and so causes but small shoots at the bottom, so that the hedge is still thin, without answering the intention of plashing. When the shoot that is designed to be plashed is bent, there is generally given a small cut to it half way through, and sloping a little downward, then it is wove about the stakes, and trimmed of its straggling superfluous branches. See the articles FENCE and HEDGE.

QUICK-BEAM, *Sorbus*, in botany. See the article SORBUS.

QUICK-SILVER, in natural history, a ponderous mineral fluid, more usually called mercury. See the article MERCURY.

QUID, a term used in the schools for the definition of a thing; which is thus called as answering to the question, *quid est?* what is it. See DEFINITION.

QUIDDITY, *Quidditas*, a barbarous term used in the schools for essence.

QUIESCENT, something at rest, in contradistinction to motion. See the articles REST and MOTION.

QUIETISTS, a religious sect, which made a great noise towards the close of the last century.

They were so called from a kind of absolute rest and inaction, which they supposed the soul to be in when arrived at that state of perfection which they called the unitive life; in which state they imagined the soul wholly employed in contemplating its God, to whose influence it was entirely submissive, so that he could turn and drive it where and how he would. In this state, the soul no longer needs prayers, hymns, &c. being laid, as it were, in the bosom, and between the arms of its God, in whom it is in a manner swallowed up.

QUIETUS, in law is the same as freed or acquitted; being used by the clerk of the pipe, and auditors in the exchequer, in their discharges given to accounts; which generally conclude with these words, *abinde recessit quietus*, and is termed a *quietus est*; and being granted to the sheriff, discharges him of all accounts due to the king.

QUILLS, the large feathers taken out of the end of the wing of a goose, crow, &c.

Quills are denominated from the order in which they are fixed in the wing, the second and third quills being the best for writing, as they have the largest and roundest barrels.

QUILTING, a method of sewing two pieces of silk, linen, or stuff, on each other, with wool or cotton between them; by working them all over in the form of chequer or diamond-work, or in flowers. The same name is also given to the stuff so worked.

QUINARIUS, in Roman antiquity, a small coin equal to half the denarius.

QUINCE, *Cydonia*, in botany, a well known genus of trees, comprehended by Linnæus among the pyrus or pear-tree, which, according to his system of botany, it agrees with, in respect of its generical characters. According to Pliny, it received the name of malus cydonia from Cydone, a town in Crete, from whence it is said to have been first brought into Italy.

Quince trees are of several kinds, as the pear-quince, the apple-quince, the Portugal-quince, &c. They are all easily propagated, either by layers, suckers, or cuttings, and require a moist soil; but is best when grafted, although it bears without it, for, by the check given to the sap thereby, it produces fruit much sooner, and in greater quantity. The season for planting quince-trees is in autumn. When quinces are unripe, they are seldom or never eaten, especially raw, as they are very rough and astringent; they mightily cool and strengthen the stomach, remove nauseas, and stop fluxes of the belly; for these purposes they are much in use, especially their juice made into a syrup, which is both pleasant and agreeably astringent. The seeds bruised well with an aqueous liquor afford a good mucilage, which is excellent in some soreness of the mouth and gums.

QUINCUNX, in Roman antiquity, denotes any thing that consists of five twelfth parts of another, but particularly of the as. See the articles UNCIA and AS.

QUINCUNX ORDER, in gardening, a plantation of trees, disposed originally in a square; and consisting of five trees, one at each corner, and a fifth in the middle: or a quincunx is the figure of a plantation of trees, disposed in several rows, both length and breadthwise, in such a manner, that the first tree in the second row commences in the center of the square formed by the two first trees in

firſt row, and the two firſt in the third, reſembling the figure of the five at cards. This diſpoſition of trees was formerly much more regarded than at preſent; but is ſtill much uſed in France, for planting trees to form a grove.

QUINDECAGON, in geometry, a plain figure with fifteen ſides and fifteen angles; which, if the ſides be all equal, is termed a regular quindecagon, and irregular when otherwiſe.

The ſide of a regular quindecagon inſcribed in a circle, is equal in power to the half difference between the ſide of the equilateral triangle, and the ſide of the pentagon, inſcribed in the ſame circle; alſo the difference of the perpendiculars let fall on both ſides, taken together.

QUINDECEMVIRI, in Roman antiquity, a college of fifteen magiſtrates, whoſe buſineſs it was to preſide over the ſacrifices.

They were the interpreters of the Sibyl's books; which, however, they never conſulted but by an expreſs order of the ſenate.

QUINQUAGESIMA SUNDAY, Shrove Sunday, ſo called as being the fiftieth day before Eaſter.

QUINQUEFOLIUM, cinquefoil, in botany, is comprehended by Linnæus under potentilla. See POTENTILLA.

QUINQUINA, in pharmacy, the ſame with the Peruvian or Jeſuits bark; the tree which produces it is called by Linnæus cinhona. See the article CINHONA.

The Peruvian bark ſhould be choſen freſh, and of a bright colour, approaching to that of cinnamon, and of a ſtrong taſte. The ſmaller pieces, in quills, are generally the beſt; the larger and flatter fragments having leſs virtue. We ſometimes meet with it cut into thin ſlices, and of a yellower colour than ordinary; this is the bark of the root, has a very ſtrong taſte, and is eſteemed by the Spaniards the choiceſt of all.

The Peruvian bark poſſeſſes the ſtomachic virtues of the other bitters, and that in ſo eminent a degree, that it is a queſtion whether any of the ſtomachics are equal to it: it ſtrengthens the ſtomach, promotes the appetite, and aſſiſts digeſtion; it diſſipates flatulencies, and is a very good medicine againſt worms. Its great virtue, however, is as a febrifuge: it cures all intermittents ſafely and ſpeedily, if properly given. Its febrifuge virtue was diſcovered to us by the Indians, among whom it had been many ages known, and firſt diſcovered by a perſon's being cured of an intermittent, by drinking the water of a pond, where ſome trees of it had accidentally fallen. It was not diſcovered to any body in this part of the world till 1640, when a Spaniard, the governor of the city of Loxa, who had behaved well to ſome of theſe people, had the diſcovery as a reward. With the new medicine he cured the viceroy's lady of a tertian, after ſhe had tried every thing elſe in vain. Hence it was called the counteſs's powder.

After this, the Jeſuits brought over a vaſt quantity, which was, in 1694, diſtributed all over Europe, and did great cures. It was then called pulvis patrem, and Jeſuit's powder; and the cardinal de Lugo having bought up a vaſt quantity of it for poor and others, it was afterwards called cardinal Lugo's powder.

Notwithſtanding the ſucceſs of this new febrifuge, whenever given properly, there were many of the phyſicians at that time, who were ſcrupulous of uſing it, as ſuſpecting it could not be ſafe to carry off ſuch a diſeaſe ſo ſpeedily, and without evacuations; but a long and happy experience of it has taught us, that it is one of the greateſt, and in prudent hands, one of the ſafeſt medicines in the world. It is given in powder from a ſcruple to a drachm for a doſe. We have a ſimple, a volatile tincture, and an extract of it in the ſhops.

QUINSEY, or QUINZY. See the article QUINZY.

QUINTAL, in commerce, the ſame with hundred weight. See WEIGHT.

QUINTESSENCE, *Quinta Eſſentia*, in chemiſtry, a preparation conſiſting of the eſſential oil of ſome vegetable ſubſtance mixed and incorporated with ſpirit of wine.

QUINTILE, *Quintilis*, in aſtronomy, an aſpect of the planets, when they are 72 degrees diſtant from one to another, or a fifth part of the zodiac.

QUINTILLIANS, a ſect of ancient heretics, thus called from their propheteſs Quintilia. In this ſect the women were admitted to perform the ſacerdotal and epiſcopal functions. They attributed extraordinary gifts to Eve for having firſt eaten of the tree of knowledge; told great things of Mary the ſiſter of Moſes, as having been a propheteſs, &c. They added, that Philip the deacon had four daughters, who were all propheteſſes, and were of their ſect. In theſe aſſemblies it was uſual to ſee the virgins entering in white robes, perſonating propheteſſes.

QUINZY, QUINSEY, or ANGINA, in medicine, a pain and inflammation of the fauces, a ſwelling of the uvula, tonſils, and larynx, which being accompanied by a fever, occaſions a difficulty of reſpiration and deglutition. This diſeaſe generally prevails about the latter end of ſpring or beginning of ſummer. When the ſwelling, pain, and redneſs appear moſtly on the outſides, it is, according to Hoffman, the prognoſtic of a happy ſolution of the diſeaſe: but when the external ſwelling ſuddenly diſappears, without a mitigation of the ſymptoms, it ſhews the morbific matter to be tranſlated elſewhere, and that the diſeaſe will change to a phrenzy, or peripneumony. This diſeaſe may alſo terminate in a ſuppuration, gangrene, or ſchirrus. A froth-

frothing at the mouth, the tongue vaſtly ſwelled, and of a purple, blackiſh colour, portend death.

The quinzy is generally diſtinguiſhed by modern writers into the idiopathic and ſymptomatic. The firſt, where it is itſelf the diſeaſe, and owes its origin only to a plethora; the ſecond, where it is but the accidental ſymptom of an inflammatory fever, or ſome other diſeaſe, about the time of its criſis.

Dr. Mead diſtinguiſhes the quinzy into three ſorts; the firſt of which he calls the watery quinzy; the ſecond, a gangrene of the tonſils; and the third a ſtrangulation of the fauces. In the firſt ſort, the glands of the mouth, palate, and neighbouring parts are ſwoln. In the ſecond, an inflammation without a perfect ſuppuration ſeizes the tonſils, which ſwell and grow hard; a gangrene ſoon enſues, which, if not ſpeedily relieved, proves fatal.

In the third ſort, all the nerves are convulſed, and the patient drops down dead ſuddenly: however, this ſpecies of the quinzy, though deſcribed by Hippocrates, is yet very rare. If it can be foreſeen, it ought to be prevented by evacuations of all kinds; that is, bleeding, purging, bliſtering, iſſues, and diuretics; and it will be of ſervice to practiſe abſtinence, or a moderation in eating and drinking. In the watery-quinzy, which ſometimes rages like an epidemic fever, eſpecially in places near the ſea, bleeding plentifully as ſoon as poſſible is recommended; afterwards clyſters, gentle purges, bliſters under the chin, and on the ſides of the neck; and if this courſe does not ſucceed, the palate muſt be pretty deeply ſcarified about the tongue and ſublingual veins.

In theſe inflammations in general, a ſlight diarrhœa relieves the patient, according to Arbuthnot. Therefore aliments which promote it are of ſervice; ſuch are tamarinds infuſed in whey, decoctions of farinaceous vegetables moderately acidulated, and ſuch as abound with a cooling nitrous ſalt are uſeful. Burnet is ſaid to be a ſpecific in the quinzy; mulberries, and all acids are beneficial. The mouth and throat muſt be kept moiſt, and the noſe clear, that the air may have a free paſſage through it. Sydenham orders to bleed plentifully in the arm, and Boerhaave directs it to be by a large orifice. Afterwards a ſublingual vein ſhould be opened; but, according to Hoffman, bleeding in the jugular yields the beſt aſſiſtance. If the ſymptoms continue to be very urgent, the bleeding may be repeated in ſix or eight hours time, till they begin to be more mild. After the firſt bleeding, Sydenham orders a ſtrong and large bliſter to be laid to the neck; then let the parts inflamed be touched with the following mixture. Take honey of roſes, as much as you pleaſe; and mix it with as much ſpirit of ſulphur as is ſufficient to give it the greateſt ſharpneſs. Afterwards the following gargle is to be held in the mouth till it is hot; and is to be repeated pretty often: take plantain-water, and frog-ſpawn, of each four ounces; red roſes, four ounces; the whites of three eggs beat in water; and two drams of cryſtal ſugar.

When the fauces are dry, hot, and the tongue ſwells, with difficulty of breathing and ſwallowing, Hoffman orders to take of the whites of eggs beat in water, two ounces; water of roſes, one ounce; ſal prunella, twelve grains; ſyrup of quinces, one ounce. Make a linctus, which is to be taken often; and let the neck be anointed as well behind as before with the following camphorated oil. Take of the oil of ſweet almonds, one ounce; oil of white poppies, one dram; camphor, half a dram; after which let the patient take a cooling emulſion.

Boerhaave, after bleeding, orders a ſtrong purge, and if that cannot be taken, a ſtrong clyſter. Emollient ſteams, or even the ſteam of hot water taken in at the mouth is beneficial. If the patient is not able to ſwallow any nouriſhment, take of good broth of fleſh meat, ten ounces; nitre, ten grains; ſpirit of ſalt, ſix drops; make a clyſter to be injected every eight hours, and retained as long as is poſſible. Hoffman ſays, that if the tumour tends to a ſuppuration, it is beſt promoted by holding dried figs in the mouth, and that when the tonſils are full of an inflammatory ichor, honey of roſes mixt with the ſpirit of vitriol, and often applied to the part with a pencil, is excellent. In a latent internal exceeding hot quinzy, the mouth muſt be frequently moiſtened with milk or cream, with an addition of ſal prunella, and ſyrup of poppies.

Dr. Pringle obſerves, that the inflammatory quinzy is the moſt frequent, as well as dangerous among ſoldiers, upon their firſt encampment; and that its tendency to bring on a ſuffocation, indicates the neceſſity of ſpeedy and large bleedings, purging, and bliſtering. He alſo recommends the following application, as one of the moſt efficacious remedies in this terrible diſorder: let a piece of thick flannel be moiſtened with equal parts of any common oil and of ſpirit of hartſhorn, and applied to the throat, to be renewed once in four or five hours: this medicine, he tells us, he had from Dr. Young, phyſician at Edinburgh. By means of this application, the neck, and ſometimes the whole body, is put into a ſweat; which, after bleeding, either carries off or leſſens the inflammation. He alſo tells us, that he has obſerved little benefit ariſing from gargles, and that the acid ones did more harm than good: however, a decoction of figs in milk and water, eſpecially if the ſpirit of ſal ammoniac be added, ſerves to thin the ſaliva, whereby the glands ſecrete more freely; a circumſtance always conducive to the cure.

In the Philoſophical Tranſactions, the jelly of black currants, ſwallowed down leiſurely in ſmall quantities, is aſſerted to be a ſpecific for a quinzy;

and

and a decoction of the leaves or bark in milk, when the jelly cannot be had, uſed as a gargle, is ſaid to cure all the inflammatory diſtempers of the throat that happen in the winter-time.

In malignant fevers, when there is an inflammation of the oeſophagus, Hoffman orders to take nitre, one dram; camphor, three grains; ſugar, one ounce; make a powder, which is to be given in an emulſion of ſweet almonds, and may alſo be held in the mouth for ſome time before it is ſwallowed. That inflammatory pain which ariſes from a ſharp ſalt ſerum in the glandulous parts of the fauces with redneſs and a copious flux of ſaliva, but without a fever, may be cured with a gargle of brandy alone. When there is a large defluxion of an impure ſerous humour upon the fauces, it requires a frequent uſe of gentle laxatives. When the ſymptoms of a quinzy are ſo urgent, that the patient is in immediate danger of ſtrangling, recourſe muſt be had to bronchotomy, or opening of the wind-pipe.

QUIRE *of Paper*, the quantity of 24 or 25 ſheets.

QUIRISTER, or CHOIRISTER, a perſon appointed to ſing in the choir of a cathedral.

QUIRK, in building, a piece of ground taken out of any regular ground-plot, or floor: thus, if the ground-plot were oblong or ſquare, a piece taken out of a corner to make a court or yard, &c. is called a quirk.

QUISQUALIS, in botany, a genus of plants, whoſe flower conſiſts of five oblong, obtuſe, patent petals, inſerted in the chops of the cup, with ten briſtly ſtamina: the fruit is a dry drupe, having five angles, and containing a roundiſh nut.

QUIT-RENT, in law, a ſmall rent that is payble by the tenants of moſt manors, whereby the tenant goes quit and free from all other ſervices; and it is ſaid to be an acknowledgement, in token of ſubjection to the lord.

Antiently this payment was called white-rent, on account that it was paid in ſilver coin, and to diſtinguiſh it from rent-corn.

QUITTER-BONE, among farriers, the ſame with crotches. See CROTCHES.

QUOIL, or COIL, in the ſea language, a rope or cable laid up round, one ſack or turn over another, ſo that it may the more eaſily be ſtowed out of the way, and alſo run out free and ſmooth, without twiſtings or doublings.

QUOIN, or COIN, on board a ſhip, a wedge faſtened on the deck, cloſe to the breech of the carriage of a gun, to keep it firm up to the ſhip's ſide.

Cantic quoins are ſhort three-legged quoins, put between caſks to keep them ſteady.

QUOINS, in architecture, denote the corners of brick or ſtone walls.

The word is particularly uſed for the ſtones in the corners of brick buildings. When theſe ſtand out beyond the brick-work, their edges being chamferred off, they are called ruſtic quoins.

QUORUM, a word frequently mentioned in our ſtatutes, and in commiſſions both of juſtices of the peace and others.

It is thus called from the words of the commiſſion, *quorum* A. B. *unum eſſe volumus*. For an example, where a commiſſion is directed to ſeven perſons, or to any three of them, whereof A. B. and C. D. are to be two; in this caſe, they are ſaid to be of the quorum, becauſe the reſt cannot proceed without them: ſo, a juſtice of the peace and quorum, is one without whom the reſt of the juſtices in ſome caſes cannot proceed.

QUOTATION, in literature, a citation or paſſage, rehearſed expreſsly in one author from another.

Quotations are uſually diſtinguiſhed by inverted commas.

QUOTIDIAN, *Quotidiana*, in medicine, an intermitting fever, or ague, the paroxiſm or fit whereof returns every day.

This ſpecies of intermittent fevers is not ſo common as the tertian and quartan.

It attacks the patient early in the morning, with chilneſs and ſhivering; to which ſucceed a cardialgia, nauſea, and inflation of the belly; in ſome, a pain in the head; in others, fainting fits; and in moſt, vomiting or ſtools, or both; after which comes on the hot fit, with thirſt.

As to the cure, the beſt method ſeems to be firſt to attenuate the tough and vitiated humours in the ſtomach and inteſtines, by proper doſes of vitriolated tartar, and the like; after which a gentle emetic, diaphoretics, and diluents, are to be adminiſtered; and, laſtly, the bowels are to be ſtrengthened by bitters and ſub aſtringents; among which, the Peruvian bark claims a place, only to be uſed in ſmaller quantities than when truſted to alone for the cure.

QUOTIENT, in arithmetic, the number which ariſes by dividing the dividend by the diviſor. See DIVISION.

R.

R A B

R A liquid conſonant, being the ſeventeenth letter of our alphabet. Its ſound is formed by a guttural extruſion of the breath, vibrated through the mouth, with a ſort of quivering motion of the tongue drawn from the teeth, and cannulated, with the tip a little elevated towards the palate.

In Greek words, it is frequently aſpirated with an *h* after it, as in *rhapſody*, *rhetoric*, &c. otherwiſe it is always followed by a vowel at the beginning of words and ſyllables.

In the notes of the ancients, R. or RO. ſignifies *Roma*; R.C. *Romana civitas*; R.G.C. *rei gerendæ cauſa*; R.F.E.D. *recte factum & dictum*; RG.F. *regis filius*; R.P. *res publica*, or *Romani principes*; and R.R.R.F.F.F. *res Romana ruet ferro, fame, flamma.*

Uſed as a numeral, R anciently ſtood for 80, and with a daſh over it, thus $\bar{R}$, for 80,000; but the Greek *r*, or *ρ*, ſignified 100.

In the preſcriptions of phyſicians, R or ℞ ſtands for *recipe*, i. e. take.

RABBETING, in carpentry, the planning or cutting of channels or grooves in boards, &c.

In ſhip-carpentry, it ſignifies the letting in of the planks of the ſhip into the keel; which, in the rake and run of a ſhip, is hollowed away, that the planks may join cloſer.

RABBI, or RABBINS, a title which the Phariſees and doctors of the law, among the Jews, aſſumed, and literally ſignified maſters or excellents.

There were ſeveral gradations before they arrived at the dignity of a rabbin, which was not conferred till they had acquired the profoundeſt knowledge of the law and the traditions. However, it does not appear that there was any fixed age, or previous examination neceſſary; but when a man had diſtinguiſhed himſelf by his ſkill in the written and oral law, and paſſed through the ſubordinate degrees, he was ſaluted a rabbin by the public voice.

Among the modern Jews, for near ſeven hundred years paſt, the learned men retain no other title

R A C

than that of rabbi, or rabbins: they have great reſpect paid them, have the firſt places or ſeats in their ſynagogues, determine all matters of controverſy, and frequently pronounce upon civil affairs: they have even a power to excommunicate the diſobedient.

RABBINET, a ſmall piece of ordnance, between a falconet and a baſe. See the article CANNON.

RABBINISTS, among the modern Jews, an appellation given to the doctrine of the rabbins concerning traditions, in oppoſition to the caraites, who reject all traditions. See the article CARAITE.

RABBIT, *Cuniculus*, in zoology, a well known animal of the lepus or hare kind, with a very ſhort tail.

The rabbit, though a ſmaller, is a handſomer creature than the hare, but is of various colours even in the ſame country; its general one, in this kingdom, being a pale browniſh grey, on the back, and white on the belly; however, there are ſome darker, of a ſilvery grey, and altogether white.

There is alſo a long tailed ſpecies, of the ſize of the common rabbit, called the Siberian rabbit, from its being frequent in Ruſſia and Tartary.

RACEMUS, among botaniſts, ſignifies a cluſter or ſtalk, divided or branched into ſeveral footſtalks, ſuſtaining the flowers or fruits ſet together; ſuch are the bunches of grapes, currants, &c. racemus anciently ſignifying a bunch of grapes.

RACK, ARAC, or ARRAC, in commerce, a ſpirituous liquor made by the Tartars of Tonguſia, who are ſubject to the czarina of Muſcovy.

This kind of rack is made of mare's milk, which is left to be ſour, and afterwards diſtilled twice or thrice, between two earthen pots cloſely ſtopped, from whence the liquor runs through a ſmall wooden pipe.

This liquor is more intoxicating than brandy diſtilled from wine.

RACK, is alſo a ſpirituous liquor which the Eng-

liſh get from Batavia or Malacca, of which there are three ſorts; the one being extracted from the cocoa-tree, the ſecond from rice, and the third from ſugar; but the firſt is the beſt and moſt in uſe.

It is made of the bloſſom-bunch of the cocoa-tree; for which purpoſe, they tie the bunch while it is ſtill wrapped up within its cod, or membrane, with a piece of packthread, and then with a knife make a croſs cut in that bunch, a little above the place where it is tied, and adapt a pitcher to it to receive the liquor, which is called toddy, and is vinous, palatable, and ſweet; others uſe a bamboe-cane, inſtead of a pitcher. Having thus drawn the liquor, they let it ferment, and afterwards diſtil it.

Goa and Batavia are the chief places for rack. At Goa there are ſeveral kinds; ſingle, double, and triple diſtilled: but the double diſtilled, which is that commonly ſent abroad, is but a weak ſpirit when compared with Batavia rack; yet, on account of its peculiar and agreeable flavour, it is preferred to all the other racks of India.

The prior rack, made at Madras, the Columbo and Quilone rack, being fiery hot ſpirits, are but little valued by the Europeans, and therefore ſeldom imported, though they are highly prized among the natives.

RACKOON, *Coati*, in zoology, an American quadruped of the ſhape of a beaver, only ſomewhat ſmaller, and with hair like that of a fox; its head too is like that of a fox, only that the ears are ſhorter, roundiſh, and naked; its tail is longer than its body, and not unlike that of a cat, with annular ſtreaks of different colours.

RADIAL CURVES, are curves of the ſpiral kind, whoſe ordinates, if they may be ſo called, all terminate in the center of the including circle, appearing like radii of that circle; whence the name. See the articles CURVE and SPIRAL.

RADIALIS, or RADIÆUS, in anatomy, the name of two muſcles of the arm; one of which, called radialis internus, is one of the three flexor muſcles of the carpus, or hand, which ariſing from the internal condyle of the humerus, is inſerted into the bone of the carpus next the thumb; and the other, called radialis externus, is one of the three extenſor muſcles of the hand, which ariſing from the external condyle of the humerus, is inſerted into the firſt metacarpal bone.

RADIANT, or RADIATING POINT, in optics, is any point of a viſible object from whence rays proceed.

RADIATED FLOWERS, in botany, are ſuch as have ſeveral ſemi-florets ſet round the diſc, in form of a radiant ſtar; and are either ligulate, as in the aſter; tubuloſe, as in the centaury; or naked, as in the artemeſia.

RADIATED, is alſo uſed with reſpect to one of the ancient crowns. See the article CROWN.

RADICAL, in general, ſomething that ſerves as a baſis or foundation.

Hence phyſicians talk much of a radical moiſture. See the article MOISTURE.

In grammar, we give the appellation radical to primitive words, in contradiſtinction to compounds and derivatives.

Algebraiſts alſo ſpeak of the radical ſign of quantities, which is the character expreſſing their roots. See ROOT and CHARACTER.

RADICATION, a term uſed by ſome for the action whereby plants take root, or ſhoot out roots. See the articles ROOT and VEGETATION.

RADICLE, that part of the ſeeds of all plants, which upon vegetating becomes its root, and is diſcoverable by the microſcope. See the article VEGETATION.

RADISH, *Raphanus*, in botany, a genus of plants, whoſe flower is tetrapetalous and cruciform; the fruit is an oblong, ſmooth, ſpongy pod, having an acute point, ſwelling, and almoſt jointed, and containing ſeveral ſmooth roundiſh ſeeds.

There are ſeveral ſorts of radiſhes, as the common purple-rooted radiſh, the ſalmon radiſh, the turnep-rooted radiſh, the black Spaniſh radiſh, &c. they are all propagated by ſowing their ſeeds. The firſt and ſecond ſorts are cultivated in great quantities, for the ſupply of the London markets.

The ſeaſons for ſowing are various, according to the time they are intended for uſe. They are firſt ſown at the beginning of the year, on moderate hot beds, having a ſufficient depth of mould for their roots. In February they may be ſown on warm well-ſheltered borders; and in March, in more expoſed ſituations, for the principal crop.

It is a common practice to ſow them with other crops, as with carrots, ſpinach, &c. but it is much better to ſow the radiſhes by themſelves, and when come up, to hoe them out to the diſtance of about three inches; this will deſtroy the weeds, and encourage the roots to grow; and as they are ſoon fit for uſe, may be ſucceeded by French-beans, &c.

Radiſhes abound with a penetrating nitrous juice, which makes them diuretic, and cleanſing to the inteſtines and viſcera: they have ſomewhat alſo in their outward ſkin which is hot and biting, both which qualities help to make them a good antiſcorbutic: they agree very well with moſt conſtitutions, provided they have good ſtomachs; and the juice is ſaid to be good in the gravel, if four ounces of it be taken for four days in a morning faſting.

Horſe-RADISH. See the article HORSE-*Radiſh*.

Water-RADISH. See SISYMBRIUM.

RADIUS, in geometry, the ſemi-diameter of a circle, or a right-line drawn from the center to the circumference. See CIRCLE.

In trigonometry, the radius is termed the whole ſine, or ſine of 90°. See SINE.

RADIUS,

RADIUS, in anatomy, the exterior bone of the arm, deſcending along with the ulna from the elbow to the wriſt.

In its upper extremity there is a glenoid cavity for its articulation with the humerus; alſo a creſt, by means of which, it is articulated with the ulna: in the lower extremity the head is thicker, and of a more angular figure, with a very large hollow in the middle, for its articulation with the wriſt.

RADIX, the ſame with root. See the article ROOT.

RAFTERS, in building, are pieces of timber, which ſtanding by pairs on the reaſon or raiſing-piece, meet in an angle at the top, and form the roof of a building.

It is a rule in building, that no rafters ſhould ſtand farther than twelve inches from one another: and as to their ſizes or ſcantlings, it is provided by act of parliament, that principal rafters, from twelve feet ſix inches to fourteen feet ſix inches long, be five inches broad at the top, and eight at the bottom, and ſix inches thick. Thoſe from fourteen feet ſix inches, to eighteen feet ſix inches long, to be nine inches broad at the foot, ſeven inches at the top, and ſeven inches thick: and thoſe from eighteen feet ſix inches, to twenty-one feet ſix inches long, to be ten inches broad at the foot, eight at the top, and eight thick. Single rafters, eight feet in length, muſt have four inches and a half, and three inches three quarters in their ſquare. Thoſe of nine feet long muſt be five and four inches ſquare.

Principal rafters ſhould be nearly as thick at the bottom as the beam, and ſhould diminiſh in their length one fifth, or one ſixth of their breadth; the king-poſts ſhould be as thick as the principal rafters, and their breadth, according to the bigneſs of them that are intended to be let into them, the middle part being left ſomewhat broader than the thickneſs.

RAGWORT, *Jacobæa*, in botany, is comprehended by Linnæus with the ſenecio. See the article SENECIO.

RAGOUT, or RAGOO, a ſauce, or ſeaſoning, intended to rouſe the appetite when loſt or languiſhing.

This term is alſo uſed for any high ſeaſoned diſh prepared of fleſh, fiſh, greens, or the like; by ſtewing them with bacon, ſalt, pepper, cloves, and the like ingredients.

RAGULED, or ragged, in heraldry, jagged or knotted. This term is applied to a croſs formed of the trunks of two trees without their branches, of which they ſhew only the ſtumps.

RAJA, the title of the Indian black princes, the remains of thoſe who ruled there before the moguls.

RAJANIA, in botany, a genus producing male and female flowers on different plants; the male flower has no corolla, but conſiſts of a campanulated cup, divided into ſix oblong acuminated parts, and contains ſix ſetaceous ſtamina, which are ſhorter than the cup; the female flower is apetalous, and contains three ſtyles, crowned with obtuſe ſtigmata: the fruit is roundiſh, and contains a ſingle ſeed of the ſame form.

RAIL, in architecture, is uſed in different ſenſes, as for thoſe pieces of timber which lie horizontally between the pannels of wainſcot; for thoſe which lie over and under the baluſters in balconies, ſtair-caſes, and the like; and alſo for thoſe pieces of timber which lie horizontally from poſt to poſt in fences, either with poles or without.

RAIL, *Ortygometra*, in ornithology, a genus of birds of the order of the ſcolopaces, the beak of which is ſhorter than the toes: it is of a compreſſed form, and terminated in a point; but the two chaps are equal in length.

It is of the ſize of the common magpye, and is an elegant bird, of a bright brown colour, variegated with black ſpots: it is common in rich paſtures, where its common note is *crex*, *crex*.

RAIN, a watery-meteor, which deſcends from the clouds in form of drops of water.

Rain is apparently the precipitated vapours of watery clouds: thus, when various congeries of clouds are driven together by the agitation of the winds, they mix and run into one body, and by that means diſſolve and condenſe each other into their former ſubſtance of water; alſo the coldneſs of the air is a great means to collect, compact, and condenſe clouds into water; which being heavier than the air, muſt of neceſſity fall through it in the form we call rain. Now the reaſon why it falls in drops, and not in whole quantities, as it becomes condenſed, is the reſiſtance of the air; whereby, being broken and divided into ſmaller and ſmaller parts, the farther it paſſes through the air, it at laſt arrives to us in ſmall drops.

Mr. Derham accounts for the precipitation hence, that the veſiculæ being full of air, when they meet with a colder air than they contain, their air is contracted into a leſs ſpace; and, conſequently, the watery ſhell rendered thicker, ſo as to become heavier than the air, &c.

Others only allow the cold a part in the action, and bring in the winds as ſharers with it: indeed, it is plain, that a wind, blowing againſt a cloud, will drive its veſiculæ upon one another, by which means ſeveral of them coaleſcing, will be enabled to deſcend; and the effect will be ſtill more conſiderable if two oppoſite winds blow towards the ſame place. Add to this, that clouds already formed, happening to be aggravated by freſh acceſſions of vapour continually aſcending, may thence be enabled to deſcend.

According to Rohault, the great cauſe of rain is the heat of the air, which after continuing for ſometime near the earth, is at length carried up on high

high by a wind, and there thawing the ſnowy villi, or flocks of the half frozen veſiculæ, reduces them into drops; which, coaleſcing, deſcend.

Others, as Dr. Clarke, &c. aſcribe this deſcent of the clouds rather to an alteration of the atmoſphere than of the veſiculæ; and ſuppoſe it to ariſe from a diminution of the elaſtic force of the air. This elaſticity, which depends chiefly or wholly on the terrene exhalations, being weakened, the atmoſphere ſinks under its burden, and the clouds fall.

Now the little veſicles being once upon the deſcent, will perſiſt therein, notwithſtanding the increaſe of reſiſtance they every moment meet with. For as they all tend toward the center of the earth, the farther they fall, the more coalitions will they make; and the more coalitions, the more matter will there be under the ſame ſurface; the ſurface only increaſing as the ſquares, but the ſolidity as the cube; and the more matter under the ſame ſurface, the leſs reſiſtance there will be to the ſame matter. Thus, if the cold, wind, &c. act early enough to precipitate the aſcending veſicles, before they are arrived at any conſiderable height, the coalitions being but few, the drops will be proportionably ſmall; and thus is formed a dew. If the vapours be more copious, and riſe a little higher, we have a miſt or fog. A little higher ſtill, and they produce a ſmall rain, &c. If they neither meet with cold nor wind, they form a heavy, thick, dark ſky.

Hence many of the phænomena of the weather may be accounted for: as, why a cold ſummer is always a wet one, and a warm a dry one; Why we have commonly moſt rain about the equinoxes; Why a ſettled, thick, cloſe ſky, ſcarce ever rains till it have been firſt clear; As to the quantity of rain that falls, its proportion in ſeveral places at the ſame time, and in the ſame place at ſeveral times, we have ſtore of obſervations, journals, &c. in the Memoirs of the French academy, Philoſophical Tranſactions, &c.

RAIN-BOW, *Iris*, in meteorology, a meteor, in form of a party-coloured arch, or ſemi-circle, exhibited in a rainy ſky, oppoſite to the ſun, by the refraction of his rays in the drops of falling rain. See the article REFRACTION.

In order to illuſtrate this phænomenon, ſuppoſe BNFG (plate LXXVIII. fig. 1.) to be a ſpherical drop of falling rain, and AN a ray of the ſun falling upon it in the point N; which ray ſuppoſe refracted to F, from thence reflected to G, and there again refracted in the direction GR to the eye of a ſpectator; and let IG be perpendicular to the drop in the point G; then will the ray or beam of light, by its refraction at G, be ſeparated into ſeveral ſorts of rays, which will paint their reſpective colours in that part of the drop; of which that next the perpendicular IG will be red, as being leaſt refracted; and the reſt in order above it, viz. orange, yellow, green, blue, indigo, violet. Now it is found by computation, that the greateſt angle SEO, (fig. 2.) or EOP, becauſe OP parallel to SE, under which the moſt refrangible rays can come to the eye of the ſpectator at O, is 40° 17′; and that the great angle FOP, under which the moſt refrangible rays come to the eye at O, is 42° 2′: and ſo all the particles of water, within the difference of thoſe two angles, EF, will exhibit ſeverally the various colours of the priſm, and conſtitute the interior rain-bow in the cloud. See COLOUR.

If the beam of light go not out of the drop, at G, but is reflected a ſecond time, to H; (fig. 1 and 2) and is there refracted in the direction HS, making the angle SYA with the incident ray AN, it will paint on the part H the ſeveral colours of light; but in an inverſe order to the former, and more faint, by reaſon of the rays loſt by the ſecond reflection. It has been found alſo, that the leaſt angle SGO, or GOP, under which the leaſt refrangible rays can come to the eye at O, after two reflections and two refractions, is 50° 57′; and the leaſt angle HOP, under which the moſt refrangible rays can come to the eye in this caſe, is 54° 7′: whence all the colours of the exterior rain-bow, will be formed in the drops from G to H, which is the breadth of this bow, viz. 3° 10′; whereas the breadth of the former, or interior bow, viz. EF, is but 1° 45′; and the diſtance between the bows, viz. FG, is 8° 55′. And ſuch would be the meaſure of the bows, were the ſun but a point; but ſince his body ſubtends an angle of half a degree, it is evident, by ſo much will each bow be increaſed, and the diſtance diminiſhed.

To apprehend rightly the different affections of the rainbow, we muſt attend to the following particulars. 1. That though the rain-bow be occaſioned by the refracted and reflected light of the ſun falling on the drops of rain, yet neither of them is produced by any rays falling on any part of the drop indifferently, but by thoſe only which fall on the ſurface of the drop BLQG (fig. 1, 2, 3.) in or about the point N, as the ray AN; thoſe which fall nearer to B, or farther towards L, being unconcerned in this production. 2. The internal bow is produced by two refractions and one reflection. The firſt refraction is of the incident rays extremely near AN, by which they proceed from N to one common point or focus at F, from whence they are reflected to G, and are there a ſecond time refracted towards R, and produce the various colours of the ſaid bow. 3. There is a neceſſity that ſeveral rays ſhould be refracted together to the point F, that being reflected together from thence to G they may there go out parallel, and ſo come in quantity ſufficient to excite the ſenſation of colours in a ſtrong and lively manner. Now thoſe rays, and thoſe only, which are incident on the globule about the point N, can do this, as will appear from what follows: for, 4. The point F makes the arch QF a *maximum*, or the diſtance QF from the axis of

Fig. 7. The Plain Scale.

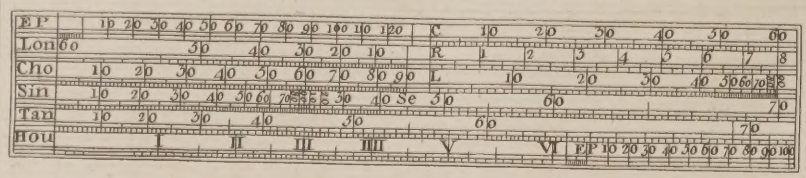


Fig. 3. Rain-bow.

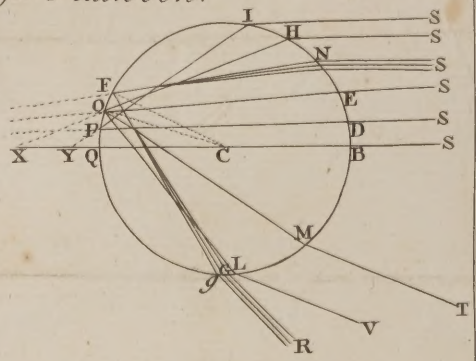


Fig. 2.

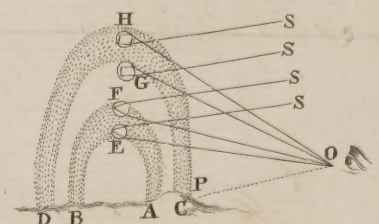
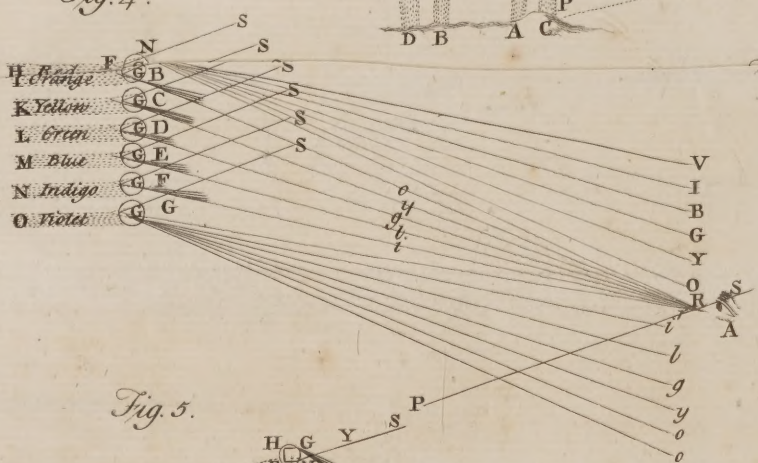


Fig. 4.



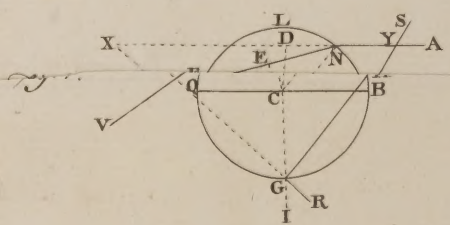


Fig. 5.

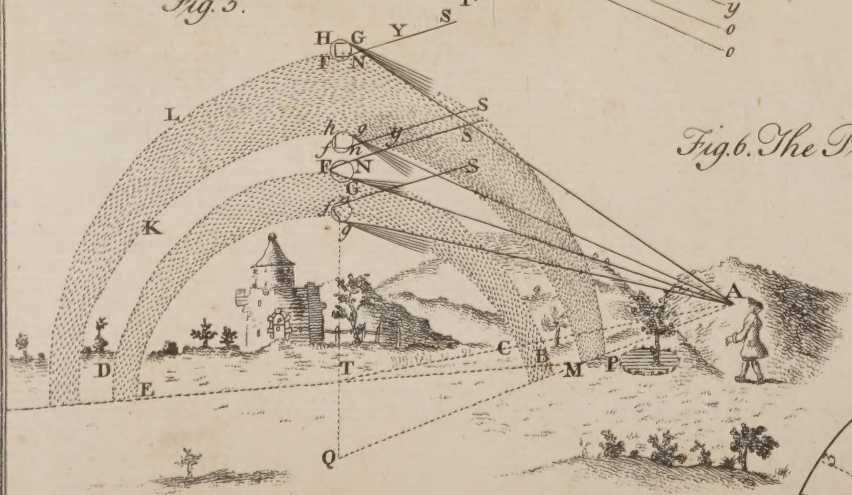


Fig. 6. The Plain Scale.

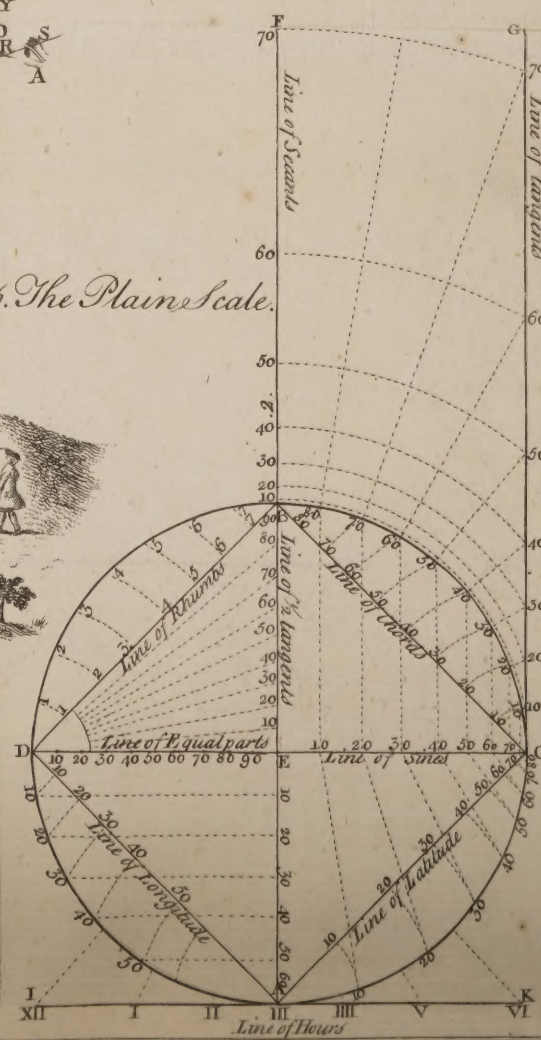
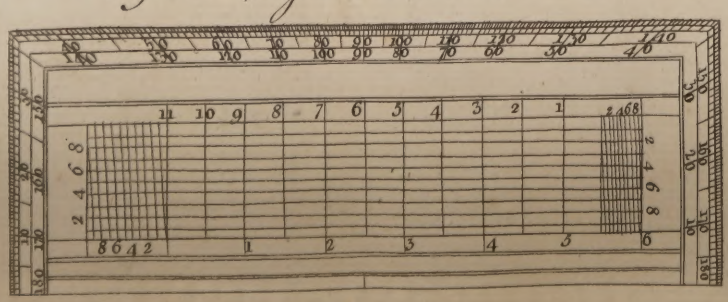


Fig. 8. Diagonal Scale.



of the drop SQ is greater than any other diſtance from whence any other rays nearer to the axis, as SD, SE, or farther from it, as SH, SI, are reflected; becauſe thoſe which are nearer after the firſt refraction tend to points in the axis produced more remote than that to which the ray SN tends; and therefore as their diſtance from the axis increaſes, ſo likewiſe will the diſtances of their points of reflection QP, QO, till the ray becomes SN; after which the rays more remote from the axis, as SH, SI, are refracted towards the points, XY, which are nearer and nearer to the axis; and this occaſions the points of reflection on the fartheſt ſide of the drop to decreaſe again from F towards Q. 5. Hence it will neceſſarily happen, that ſome rays above and below the ray SN will fall upon the ſame point, as O or P, on the fartheſt ſide; and for that reaſon they will be ſo reflected from thence as to go out of the drop by refraction parallel to each other. Thus let SE below, and SH above the ray SN be refracted both to one point O; from hence they will be reflected to M and L, and will there emerge parallel, it is true, but alone; being diveſted of their intermediate rays SN, which going to a different point F will be reflected in a different direction to G, and emerge on one ſide, and not between thoſe rays, as when they were incident on the drop. All which is evident from the figure. 6. As this will be the caſe of all the rays which are not indefinitely near to SN, it is plain that being deprived of the intermediate rays, their denſity will be ſo far diminiſhed, as to render them ineffectual for exciting the ſenſation of colours; and they are therefore called inefficacious rays, in contradiſtinction to thoſe which enter the drop near SN, and which, having the ſame point F of reflection, are not ſcattered like the others, but emerge together at G, ſo as to conſtitute a beam GR of the ſame denſity with the incident beam SN, and therefore capable of exhibiting a vivid appearance of colours, and for this reaſon are called efficacious rays.

Phænomena of the RAINBOW. The firſt is, that each is variegated with all the priſmatic colours. This is a neceſſary conſequence of the different refrangibility of the rays refracted and reflected in drops of falling rain. Let *A* (fig. 4.) be ſuch a drop, SN a ray entering it at N, which is refracted to F, from whence refracted to G, where, as it emerges, it is refracted into all the ſeveral ſorts of rays of which it is compoſed, viz. GR, the leaſt refrangible or red-making ray, GO the orange, GY the yellow, GG the green, GB the blue, GI the indigo, and GV the violet, or moſt refrangible ray.

The truth of this may be eaſily proved by experiment, by ſuſpending a glaſs globe filled with water in the ſun-ſhine, and viewing it in ſuch a poſition, that the rays SN will fall upon it, and emerge to the eye at A, under the ſeveral angles from SFR to SFV; which may be eaſily effected by letting the globe deſcend from *A* to G, by a ſtring going over a pulley.

Hence, the ſecond phænomenon, viz. the circular form, is accounted for, and alſo the third, which is the breadth of the bow; for that will be equal to the angle $ARG = RGV = 1^\circ\ 45'$, where the ray, as here, emerges after one reflection. Theſe particulars are repreſented more completely in fig. 5. where BGD is the red circumference formed by the rotation of the ray *A*G, that can firſt come to the eye at A; and C*g*E is the violet arch formed by the leaſt refrangible ray *gA*; after which the rays are all refracted below the eye. And thus, by the intermediate rays and colours, the whole interior bow is produced.

The fourth phænomenon is the appearance of two bows. This follows from hence, that after an efficacious ray of light SN, entering a drop of rain, has been twice reflected on the fartheſt ſide at F and H, it will emerge refracted into all its ſimple or conſtituent rays at G upon the upper ſide of the drop, ſo as to make with the incident ray the angle $GYN, = SYA, = 54^\circ\ 10'$, if that ray be the violet ſort, or moſt refrangible; but if it be of the red or leaſt refrangible ſort, then the ſaid angle is but $50^\circ\ 58 = Sy A$.

Therefore all thoſe drops which are ſo ſituated around the eye, that their moſt refrangible rays ſhall fall upon it, muſt with thoſe rays make an angle with the the line AP paſſing through the eye parallel to the ſun's rays, viz. the angle GAP, equal to the angle SYA, or $GAP = 54^\circ\ 10'$. Theſe rays, therefore will every where exhibit a violet colour in the arch PGL. For the ſame reaſon, thoſe drops whoſe leaſt refrangible rays fall upon the eye at A, make the angle $gAP = 50^\circ\ 58$; and ſo the ray A*g*, revolving about the axis AQ, will deſcribe the circular arch M*g*K, which will exhibit the deepeſt red; and all the drops between G and *g* will paint the ſeveral other coloured peripheries, all which together will complete the exterior bow.

The fifth phænomenon is the greater breadth of the exterior bow. Thus, if from $54^\circ\ 10'$ we ſubduct $50^\circ\ 58'$, we ſhall have $3^\circ\ 12' = Gg =$ the width of the outer bow; which, therefore is almoſt twice as wide as the interior bow.

The ſixth phænomenon is the diſtance between the two bows, which is thus determined: from the angle which the leaſt refrangible ray in the upper bow makes with the axis AP, viz. $50^\circ\ 58'$, ſubtract the angle $42^\circ\ 2'$ which the moſt refrangible rays make therewith in the lower bow, and the remainder $8^\circ\ 56' = gAF$ is the arch of diſtance between the bows.

The ſeventh phænomenon is the inverſe order of the colours in the two bows. This follows from the contrary parts of the drop on which the ray is

incident, and from whence it emerges and is refracted. Thus, becauſe the rays SN enter the upper part of the drop, and emerge from the lower, it is evident the rays refracted in this caſe (viz. in the interior bow) will have a ſituation quite the reverſe of thoſe which enter on the lower part of the drop, and are refracted from the upper, as in the exterior bow, whoſe colours are violet, indigo, blue, green, yellow, orange, and red; whilſt thoſe of the other are red, orange, yellow, green, blue, indigo, and violet; counting from the upper parts downwards in both.

The eighth phænomenon is the faintneſs of the exterior bow, in compariſon of the interior one. This is the conſequence of the rays being twice reflected within the drops which form the outer bow, They who make the experiment in a dark chamber, may wonder when they obſerve how large a part of the beam (that enters the globule at N) goes out at F, that there ſhould be enough in the remaining part FG to exhibit the colours ſo ſtrong and vivid in the firſt bow as they appear; but then, conſidering how much of this reſidual ray is refracted at G, it is rather a wonder how the very ſmall part reflected to H, ſhould there when refracted, be in quantity ſufficient to exite any diſtinct ideas of colours at all.

The ninth phænomenon is, that ſometimes more than two bows appear; as in a very black cloud we have obſerved four and a faint appearance of a fifth: but this happens rarely. Now, theſe ſpurious bows as we may call them, cannot be formed in the manner as the two principal bows are, that is, by refraction after a third, fourth, fifth, &c. refraction; for the beam is by much too weak to exhibit colours by refraction even after the third reflection only, much leſs would it after a fourth or fifth. Beſides, though after a third and fourth reflection of the rays they ſhould be ſuppoſed capable of ſhewing their colours, yet the bows made thereby would not appear at the ſame time with the other two, nor in the ſame part of the heavens, but in the rain between us and the ſun, and muſt be viewed by the ſpectator's face turned towards the ſun and not from it, as in the other caſe.

The tenth phænomenon, is the appearance of the bows in that part of the heavens oppoſite to the ſun. This neceſſarily happens from the incident and emergent ray being both on one ſide of the drop; for it is evident, that in order to ſee the colours, we muſt look to that part againſt which the ſun ſhines.

The eleventh phænomenon is, that they never appear but when and where it rains. This is becauſe rain affords a ſufficient plenty of drops, or aqueous ſpherules, proper to reflect and refract the light fit for this purpoſe, which cannot be done without a requiſite ſize, figure, and diſpoſition of the particle, which the vapour of the cloud does not admit, and therefore clouds alone exhibit no ſuch appearance.

The twelfth phænomenon is the dimenſion of the bows. This is determined eaſily; for continuing the axis AP to Q, the center of the bows, we have the ſemidiameter of each bow in the angle QA*g* or QAG; the double of which gives the angles which the whole diameters of the bows ſubtend, and are therefore the meaſure of their magnitude. The thirteenth phænomenon is the altitude of the bow above the horizon, or ſurface of the earth. This is equal to the angle GAT, which may be taken by a quadrant, or it may be known for any time by having given the ſun's altitude, which is equal to the angle TAQ; which therefore ſubducted from the conſtant angles QAF, or QAY, will always leave the angle of the apparent height of the bow.

Lunar RAINBOW. The moon ſometimes alſo exhibits the phænomenon of an iris, by the refraction of her rays in drops of rain in the night-time.

Ariſtotle ſays, he was the firſt that ever obſerved it; and adds, that it is never viſible, but at the time of full moon.

The lunar iris has all the colours of the ſolar, only fainter.

Marine RAINBOW, the ſea-bow, is a phæmenon ſometimes obſerved in a much agitated ſea, when the wind ſweeping part of the tops of the waves, carries them aloft; ſo that the rays of the ſun are refracted, &c. as in a common ſhower.

RAISER, in building, a board ſet on edge under the fore ſide of a ſtep, ſtair, &c.

RAISING-PIECES, or REASON-PIECES, in architecture, are pieces that lie under the beams, and over the poſts or puncheons.

RAISINS, grapes prepared by ſuffering them to remain an the vine till they are perfectly ripe, and then drying them in the ſun, or by the heat of an oven. The difference between raiſins dried in the ſun, and thoſe dried in ovens, is very obvious: the former are ſweet and pleaſant, but the latter have a latent acidity with the ſweetneſs that renders them much leſs agreeable.

The common way of drying grapes for raiſins, is to tie two or three bunches of them together while yet on the vine, and dip them into a hot lixivium of wood aſhes with a little of the oil of olives in it. This diſpoſes them to ſhrink and wrinkle, and after this they are left on the vine three or four days ſeparated on ſticks in an horizontal ſituation, and then dried in the ſun at leiſure, after being cut from the tree. The fineſt and beſt raiſins are thoſe called in ſome places Damaſcus and Jube raiſins; which are diſtinguiſhed from the others by their ſize and figures: theſe are flat and wrinkled on the ſurface, ſoft and juicy within, and near an inch long, and when freſh and growing on the bunch, are of the ſize and ſhape of a large olive.

The

The raiſins of the ſun and jar-raiſins, are all dried by the heat of the ſun, and theſe are the ſorts uſed in medicine. However, all the kinds have much the ſame virtues; they are all nutritive and balſamic; they are allowed to be attenuant, are ſaid to be good in nephritic complaints, and are an ingredient in pectoral decoctions, in which caſes, as alſo in all others where aſtringency is not required of them, they ſhould have the ſtones carefully taken out.

RAITING, or RATING, the laying of flax, hemp, timber, &c. when green, in a pond or running water, to ſeaſon and prepare it for future uſes.

RAKE *of a ſhip* is all that part of her hull which hangs over both ends of her keel. That which is before, is called the fore-rake, or rake-forward; and that part which is at the ſetting on of the ſtern-poſt, is called the rake-aft, or afterward.

RAKE *of the rudder*, is the hindermoſt part of it.

RAKING-TABLE, or RAKED-TABLE, among architects, is a member hollowed in the ſquare of a pedeſtal, &c.

RALLYING, in a war, re-aſſembling or calling together troops broken and put to flight.

RAM, in zoology, the male of the ſheep kind. See the article SHEEP.

RAM, in aſtronomy, the ſame with Aries. See the article ARIES.

Battering RAM, in antiquity, a military engine uſed to batter and beat down the walls of places beſieged.

The battering ram was of two ſorts, the one rude and plain the other compound. The former ſeems to have been no more than a great beam which the ſoldiers bore on their arms and ſhoulders, and with one end of it by main force aſſailed the wall. The compound ram is thus deſcribed by Joſephus: it is a vaſt beam, like the maſt of a ſhip, ſtrengthened at one end with a head of iron, ſomething reſembling that of a ram, whence it took its name. This was hung by the middle with ropes to another beam, which lay acroſs two poſts; and hanging thus equally ballanced, it was by a great number of men drawn backwards and puſhed forwards, ſtriking the wall with its iron head.

Plutarch informs us, that Mark Anthony, in the Parthian war, made uſe of a ram fourſcore feet long: and Vitruvius tells us, that they were ſometimes an hundred and ſix, and ſometimes an hundred and twenty feet in length; and to this perhaps the force and ſtrength of the engine was in a great meaſure owing. The ram was managed at one time by a whole century of ſoldiers, and they being ſpent, were ſeconded by another century, ſo that it played continually without any intermiſſion.

RAM'S-HEAD, in a ſhip, is a great block belonging to the fore and main-halliards. It has three ſhivers in it, into which the halliards are put, and in a hole at the end of it are reeved the ties.

RAMADAN, a ſolemn ſeaſon of faſting among the Mahometans, kept in the ninth month of the Arabic year. This faſt conſiſts in abſtaining from meat and drink, and from lying with their wives each day, from the riſing of the ſun till the ſtars appear; and is of ſuch ſtrict obligation, that none is excuſed from it; for the ſick, and all others who cannot obſerve it in this month, are obliged to faſt another entire month inſtead of it. So ſuperſtitious are the Mahometans in the obſervance of this lent, that they dare not waſh their mouths, or even ſwallow their ſpittle. The men are, indeed, allowed to bathe themſelves, on condition they do not plunge the head under water, leſt ſome drops enter by the mouth or ears, &c. but as for the women, they are ſtrictly forbid bathing, for fear of taking in water at the pudendum. However they frequently feaſt all night. The Mahometans call this month holy, and believe that as long as it laſts, the gates of paradiſe are open, and thoſe of hell ſhut.

RAMAGE, the boughs or branches of trees.

RAMIFICATION, the production of boughs or branches, or of figures reſembling branches.

RAMMER, an inſtrument uſed for driving down ſtones or piles into the ground; or for beating the earth, in order to render it more ſolid for a foundation.

RAMMER *of a Gun*, the gun-ſtick; a rod uſed in charging of a gun, to drive home the powder, as alſo the ſhot and the wad, which keeps the ſhot from rolling out. The rammer of a great gun is uſed for the ſame purpoſe. It has a round piece of wood at one end, and the other is uſually rolled in a piece of ſheep-ſkin, fitted to the bore of the piece, and is uſed to clear her after ſhe has been diſcharged, which is called ſpunging the piece.

RAMPANT, in heraldry, a term applied to a lion, leopard, or other beaſt that ſtands on his hind legs, and rears up his fore feet in the poſture of climbing, ſhewing only half his face, as one eye, &c. It is different from ſaliant, in which the beaſt ſeems ſpringing forward, as if making a ſally.

RAMPART, in fortification, is an elevation of earth round a place capable of reſiſting the cannon of an enemy; and formed into baſtions, curtins, &c.

A rampart ought to be ſloped on both ſides, and to be broad enough to allow room for the marching of waggons and cannon, beſide that allowed for the parapet, which is raiſed on it: its thickneſs is generally about ten or twelve fathom, and its height not above three, which is ſufficient to cover the houſes from the battery of the cannon. The rampart is encompaſſed with a ditch, and is ſometimes lined or fortified on the inſide, otherwiſe it has a berme. See the article BERME.

Upon

Upon the rampart ſoldiers continually keep guard, and pieces of artillery are planted there for the defence of the place.

RAMPART, in civil architecture, is uſed for the ſpace left between the wall of a city, and the next houſes.

RAMPION, in botany. See the article PHYTEUMA.

RANCID, denotes a fatty ſubſtance that is become rank or muſty; or has contracted an ill ſmell by being kept cloſe.

RANDIA, in botany, an evergreen ſhrub, riſing to the height of ten or twelve feet, and covered with a whitiſh bark; the branches come out oppoſite from the ſide of the ſtalk, each pair croſſing the other. The leaves are of a thick conſiſtence, about an inch long, and three quarters broad, a little indented at the top, and placed by pairs ſtanding on ſhort footſtalks; at the joints immediately under the leaves, are produced two ſhort ſpines ſtanding oppoſite. The flowers are produced from the ſide of the branches, they each are ſmall, white, and tubuloſe, with the limb divided ſlightly into five parts, and contain five ſhort filaments, topped with oblong antheræ. The fruit is an oval berry, having a brittle ſhell under a thin ſkin, containing one cell, which incloſes many compreſſed, orbiculated, cartilaginous ſeeds, ſurrounded with a black pulp. This plant is propagated by ſeeds, but, being a native of the Weſt-Indies, it requires a hot-houſe to preſerve it in this climate.

RANDOM SHOT, in gunnery, is a ſhot made when the muzzle of a gun is raiſed above the horizontal line, and is not deſigned to ſhoot directly, or point-blank.

The utmoſt random of any piece is about ten times as far as the bullet will go point-blank. The The bullet will go fartheſt when the piece is mounted to about 45° above the level range. See the article GUNNERY.

RANGE, in gunnery, the path of a bullet, or the line it deſcribes from the mouth of the piece to the point where it lodges. If the piece lie in a line parallel to the horizon, it is called the right or level range: if it be mounted to 45° it is ſaid to have the utmoſt range, all others being 00 and 45° are called the intermediate ranges.

RANGER, a ſworn officer of a foreſt, appointed by the king's letters patent, whoſe buſineſs is to walk through his charge, to drive back the deer out of the purlieus, &c. and to preſent all treſpaſſes within his juriſdiction at the next foreſt-court.

RANGES, in a ſhip, two pieces of timber that go acroſs from ſide to ſide; the one on the forecaſtle, a little abaft the foremaſt, and the other in the beak-head, before the wouldings of the bowſprit.

RANGING, in war, diſpoſing the troops in the order proper for an engagement, or for marching.

RANGING, in building, ſignifies running ſtrait, when the ſides of a work do not break into angles.

RANK, the order or place allotted a perſon, ſuitable to his quality or merit.

RANK, in war, is a row of ſoldiers, placed ſide by ſide.

RANSOM, a ſum of money paid for the redemption of a ſlave, or for the liberty of a priſoner of war.

In our law-books, ranſom is alſo uſed for a ſum paid for the pardon of ſome great offence, and to obtain the offender's liberty.

RANT, in the drama, an extravagant, unnatural, and improbable flight of paſſion.

RANULA, or RANA, in medicine, a tumour under the tongue, which, like a ligature, hinders a child from ſpeaking or ſucking.

The matter contained in theſe tumours is various, it being ſometimes a tenacious and mucous lymph, ſometimes a thick and purulent matter, and ſometimes of a hard and ſtony conſiſtence.

The ſafeſt method of cure, according to Heiſter, is to turn the tongue upwards, and to make a tranſverſe inciſion through the tumour, in order to diſcharge the included matter; after which you may deterge or deſtroy the remaining tunic with honey of roſes ſharpened with ſpirits of vitriol, and then the cure may be eaſily completed with a mixture of oil and ſugar. Sometimes the tubercle breaks of itſelf, and then you muſt deterge and heal the ulcer as before.

RANUNCULUS, crowfoot, in botany, a genus of plants, whoſe flower conſiſts of five obtuſe petals with ſmall ungues, each having an open nectarium above the claws; the filaments are numerous, about half the length of the petals, and terminated by erect, oblong, obtuſe, twin antheræ: there is no pericarpium; but the ſeeds, which are irregular and numerous, are connected to the receptacle by very ſhort peduncles.

Botaniſts enumerate divers ſpecies belonging to this genus, but the oriental ſorts are moſt admired and cultivated in our gardens, as few flowers equal them, either in richneſs of colour, or for the variety and beautiful mixture of their tints. They are natives of Turkey, Arabia, and Perſia, from whence they have been imported into Europe.

A good ranunculus may be diſtinguiſhed by the following properties: 1. The ſtalk or ſtem, ſtraight, erect, ſtrong, well proportioned, and ſurmounted by a flower, well diſpoſed and ſtanding evenly. 2. The flower large, well turned, full like a roſe, and the petals cupping or bending into a ſemicircle. 3. The petals bright, thick, and large enough to hide the ſtyle. 4. The colours with which the petals are diſtinguiſhed, ſhould be diſpoſed in even, ſtraight, and diſtinct lines, without mixing or running into each other. The particular colours that moſt ſet off a flower, are an agreeable mixture of gold

gold and ruby, or brown; ſtripes of violet, or tyrian; purple or white, edged with vermilion, blue, or black. If all theſe properties meet in a ranunculus, it may then be pronounced a perfect flower; but as this perfection is rather to be wiſhed for than expected; and as a ranunculus that has two or three of theſe properties, may be reckoned a fine flower, it may therefore be worthy the eſteem of the curious.

This beautiful flower is either increaſed by off-ſets from the roots, or by ſowing its ſeeds: the beſt ſoil for the ranunculus, is a good rich loam, not very ſtrong, taken from the ſurface of a common, and well mixed with cow-dung, at leaſt a year before it is wanted; the depth which this ſhould be laid in beds, where they are intended to blow, ſhould be about three feet deep, which ſhould be elevated ſix or eight inches above the common ſurface, if the place is naturally wet, otherwiſe the fibres would rot.

When the earth in the beds is ſettled, and the ſeaſon for planting is come, which is from the middle of October to the latter end of November, the roots ſhould be placed about two inches in depth, obſerving to place them with their crowns upright, and at about ſix inches aſunder, and afterwards levelling the ſurface of the earth. In December, the buds will appear above-ground, when a ſprinkling of freſh earth over the beds will be of ſervice; and they ſhould be arched over with hoops covered with mats in bad weather. In the ſpring, the flower-ſtems will appear, when the earth between the plants ſhould be ſtirred, which will deſtroy the weeds and ſtrengthen the bloom.

When the flowers and leaves are decayed, the roots ſhould be taken up and cleaned of the earth which may adhere to them, and after being dried in the ſhade, they ſhould be reſerved in a dry room till the following autumn, which is the ſeaſon for planting them again.

Thoſe curious floriſts who are deſirous of new varieties, endeavour to do ſo by ſaving ſeed from thoſe ranunculuſes which are ſemi-double, thoſe that are very double rarely producing any; for this purpoſe, ſuch ſemi-double ones ſhould be pitched upon as have the fineſt and brighteſt colours: being prepared with the ſeed, the ſeaſon for ſowing it is in the ſpring or Auguſt, the latter ſeaſon is to be preferred; for if they are well protected from the rains and froſts, they will be much ſtronger than thoſe ſown in the ſpring; after which, all the trouble will be to keep the pots or boxes of ſeedlings well watered, and when the leaves decay, the roots are to be taken up, and preſerved till the ſeaſon for planting, when they may be treated as before-directed for the old roots. The next year the floriſt will reap the fruits of his labour, his new flowers will then appear, and, in all probability, fully gratify his curioſity with their beauty; and by this method of ſowing the ſeeds every year, he will not only encreaſe his ſtock of roots, but alſo raiſe new beauties, which may be greatly mended by changing the ſeeds into freſh ground; it will alſo be neceſſary to take away all the earth out of the beds, in which the roots were blown the preceding year, and put in freſh, if it is intended that the ranunculuſes are to be planted there again, otherwiſe they will not thrive near ſo well.

To this genus of ranunculus, Linnæus has added the ficaria of Dillenius, and the ranunculoides of Vaillant.

RAPA, the turnep, in botany. See the article TURNEP.

RAPE, a ſpecies of braſſica, or cabbage, deſcribed by authors under the name of the napus ſylveſtris and bunius ſylveſtris.

This plant is much cultivated for feeding cattle in ſeveral counties of England. The ſeaſon for ſowing is about the middle of June, and the plants afterwards ſhould be hoed out as practiſed with turneps, with the difference only of leaving them much nearer together.

As this plant is ſo hardy as not to be deſtroyed by froſt, it is of great ſervice in hard winters for feeding ſheep; for when the ground is ſo hard frozen as that the turneps cannot be taken up, theſe plants may be cut off for a ſupply: they will alſo afford late food, after the turneps are run to ſeed; and if it is afterwards permitted to ſtand for ſeed, it will pay extremely well, for from the ſeed is drawn an oil, called rape-oil, which is uſed in the woollen manufactures, and, in the materia medica, is eſteemed attenuant, cordial, and ſudorific.

RAPE, in law, the having carnal knowledge of a woman by force and againſt her will.

RAPE *of the Foreſt*, a treſpaſs committed in a foreſt by violence.

RAPE, is alſo a name given to the diviſion of a county, and ſometimes means the ſame as a hundred, and at other times ſignifies a diviſion conſiſting of ſeveral hundreds; thus Suſſex is divided into ſix rapes, every one of which, beſides its hundreds, has a caſtle, a river, and a foreſt, belonging to it.

The like parts in other counties are called tithings, lathes, or wapentakes.

RAPE, alſo ſignifies the ſtalks of the cluſters of grapes, when dried and freed from the fruit. This is uſed in making vinegar.

RAPHANUS, the radiſh, in botany. See the article RADISH.

RAPIER, formerly ſignified a long, old-faſhioned, broad ſword, ſuch as thoſe worn by the common ſoldiers; but it now denotes a ſmall ſword, as contradiſtinguiſhed from a back-ſword.

RAPINE, in law, taking away another's goods, &c. openly and by violence.

RAPISTRUM, in botany, the ſame with crambe. See the article CRAMBE.

RAPTURE, an extaſy or tranſport of mind. See EXTASY, ENTHUSIASM, &c.

RAPUNTIUM, the cardinal-flower, in botany, a genus of plants, whoſe flower is monopetalous and ſlightly ringent; the tube is long, cylindrical, and a little curved; the limb is cut into five ſegments, two of which form the upper lip, and are leſs than the three lower ones, which compoſe the under lip: the ſtamina are five ſubulated filaments, the length of the tube, topped with oblong antheræ, joined in a cylindrical form at top, but opening in five parts at their baſe: the fruit is an oval capſule, opening at top, and contains many very ſmall ſeeds.

RAREFACTION, *Rarefactio*, in phyſics, the act whereby a body is rendered rare; that is, brought to poſſeſs more room, or appear under a larger bulk without acceſſion of any new matter.

Rarefaction is moſt properly reſtrained to that expanſion of a maſs into a larger bulk, which is effected by heat. All expanſion from other cauſes they call dilatation.

It is by rarefaction that gun-powder has its effect, and to the ſame principle alſo we owe our æolipiles, thermometers, &c.

The degree to which the air is rarifiable, exceeds all imagination; ſuch is the rarefaction of common air from its own principle of elaſticity, and without any previous condenſation, that Mr. Boyle found it to dilate itſelf ſo as to take up 13679 times its former ſpace; and when compreſſed, the ſame author found its greateſt ſpace when moſt rarified, to its leaſt when moſt condenſed, as 550000 to 1.

Such an immenſe rarefaction, Sir Iſaac Newton ſhews, is inconceivable on any other principle than that of a repelling force inherent in the air, whereby its particles mutually fly from one another.

This repelling force, he obſerves, is much more conſiderable in air than in other bodies, as being generated from the moſt fixed bodies, and that with much difficulty, and ſcarce without fermentation; thoſe principles being always found to fly each other with the moſt force, which, when in contact, cohere the moſt firmly. M. Mariotte eſtabliſhed this as a principle, from experiments, that the different rarefactions or condenſations of the air, follow the proportion of the weights wherewith it is preſſed. Hence, ſuppoſing the mercury in the level of the ſea ſuſpended to 28 inches, which is the weight of the whole atmoſphere; and that 60 feet height of air are equivalent to a line or $\frac{1}{12}$ of an inch of mercury; ſo that the barometer, at the height of 60 feet from the ſea, would fall a line.

It is eaſy finding what height of air would be equal to a ſecond, or any other line of mercury; for, as 28 inches of mercury $\frac{1}{12}$ are to 28 inches, ſo is the height of 60 feet of air to a fourth term, which is the height of air correſponding to a ſecond line of mercury. And after the ſame manner, may the height of air correſponding to each line be found, which will make a geometrical progreſſion, the ſum whereof will be the whole height of the atmoſphere, and of conſequence a certain part of that ſum will be the height of a mountain, at whoſe top the barometer ſhall have ſunk a certain quantity.

RAREFACTIVES, in medicine, remedies that open and enlarge the pores of the ſkin, to give an eaſy vent to the matter of perſpiration: or ſuch medicines as rarify the blood, as aniſe, mallows, pellitory, chamomile-flowers, linſeed, &c.

RASANT, or RAZANT, in fortification. Raſant-flank, or line, is that part of the curtin or flank whence the ſhot exploded raſe, or glance, along the ſurface of the oppoſite baſtion.

RASH, in medicine, an eruption upon the ſkin, thrown out in fevers or ſurfeits.

RASP, a rank ſort of file. See the article FILE.

RASPBERRY-BUSH, in botany, a ſpecies of rubus; the root is perennial, and divided into ſeveral branches, from which ariſe ſeveral annual ſtalks, about ſix feet high, armed with thorns: the leaves are like thoſe of the bramble, but more tender and ſoft, of a browniſh green above, but whitiſh underneath: the flowers are white, and conſiſt of five petals, diſpoſed in the form of a roſe; and the cup is divided into five parts, from the center of which the piſtil ariſes, ſurrounded with many ſtamina, which is afterwards ſucceeded by a well-known fruit, of a white or red colour.

The raſpberry is commonly propagated by ſuckers, which ſhould be planted about two feet aſunder in the rows, and five feet row from row; they like a good ſtrong freſh ſoil. In autumn, thoſe ſhoots which produced the fruit will decay, when they ſhould be taken off, and a few of the ſtrongeſt young ſhoots preſerved, for bearing the ſucceeding year; cutting out all thoſe that are weak, and digging between the rows in winter, which is all the management they require.

RAT, in zoology, the Engliſh name of ſeveral ſpecies of the mus-kind; as the common-rat, the ground-rat, and the water-rat.

RAT-TAILS, or ARRESTS, in the manege, ſignify hard callous ſwellings upon the hinder legs, under the hough running along, the ſinew.

A horſe is called rat-tail when he has no hair upon his tail.

RATAFIA, a fine ſpirituous liquor, prepared from the kernels, &c. of ſeveral kinds of fruit, particularly of cherries, and apricots.

RATCH, or RASH, in clock-work, a ſort of wheel having twelve fangs which ſerve to lift up the detents every hour, and make the clock ſtrike. See CLOCK.

RATCHETS, in a watch, are the ſmall teeth at the bottom of the fuſy, or barrel, which ſtops it in winding up.

RATE,

RATE, a ſtandard or proportion, by which either the quantity or value of a thing is adjuſted.

RATE *of a ſhip of war*, is its order, degree, or diſtinction, as to magnitude, burden, &c. The rate is uſually accounted by the length and breadth of the gun deck, the number of tons, and the number of men and guns the veſſel carries. Of theſe there are ſix rates. A firſt rate man of war has its gun-deck from 159 to 174 feet in length, and from 44 to 50 feet broad; it contains from 1313 to 1882 tons, has from 706 to 800 men, and carries from 96 to 100 guns. Second rate ſhips have their gun-decks from 153 to 165 feet long, and from 41 to 46 broad; they contain from 1086 to 1482 tons, and carry from 524 to 640 men, and from 84 to 90 guns. Third rates have their gun-decks from 140 to 158 feet in length, from 37 to 42 feet broad; they contain from 871 to 1262 tons; carry from 389 to 476 men, and from 64 to 80 guns. Fourth rates are in length on the gun-decks from 118 to 146 feet, and from 29 to 38 broad, they contain from 448 to 915 tons; carry from 226 to 346 men, and from 48 to 60 guns. Fifth rates have their gun-decks from 100 to 120 feet long, and from 24 to 31 broad; they contain from 259 to 542 tons; and carry from 145 to 190 men, and from 26 to 44 guns. Sixth rates have their gun-decks from 87 to 95 feet long, and from 22 to 25 broad; they contain from 152 to 256 tons, carry from 50 to 110 men, and from 16 to 24 guns.

It is to be obſerved, that the new built ſhips are much larger, as well as better than the old ones of the ſame rate; whence the double numbers all along: the larger of which expreſs the proportions of the new-built ſhips, as the leſs thoſe of the old ones. See the articles SHIP and NAVY.

RATEEN, or RATTEN, in commerce, a thick woollen ſtuff, quilled, woven on a loom with four treddles, like ſerges, and other ſtuffs, that have the whale or quilling.

RATIFICATION, *Ratificatio*, an act approving of, and confirming ſomething done by another in our name.

RATIO, in arithmetic and geometry, is that relation of homogeneous things which determines the quantity of one from the quantity of another, without the intervention of a third.

Two numbers, lines, or quantities, A and B, being propoſed, their relation one to another may be conſidered under one of theſe two heads: 1. How much A exceeds B, or B exceeds A; and this is found by taking A from B, or B from A, and is called arithmetic reaſon or ratio. 2. Or how many times, and parts of a time, A contains B, or B contains A; and this is called geometric reaſon or ratio; (or, as Euclid defines it, it is the mutual habitude, or reſpect, of two magnitudes of the ſame kind, according to quantity; that is, as to how often the one contains, or is contained in the other) and is found by dividing A by B, or B by A; and here note, that that quantity which is referred to another quantity, is called the antecedent of the ratio; and that to which the other is referred, is called the conſequent of the ratio; as, in the ratio of A to B, A is the antecedent, and B the conſequent. Therefore any quantity, as antecedent, divided by any quantity as a conſequent, gives the ratio of that antecedent to the conſequent.

Thus the ratio of A to B is $\frac{A}{B}$, but the ratio of B to A is $\frac{B}{A}$; and, in numbers, the ratio of 12 to 4 is $\frac{12}{4} = 3$, or triple; but the ratio of 4 to 12 is $\frac{4}{12} = \frac{1}{3}$, or ſubtriple.

And here note, that the quantities thus compared, muſt be of the ſame kind; that is ſuch, which, by multiplication, may be made to exceed one the other, or as theſe quantities are ſaid to have a ratio between them, which, being multiplied, may be made to exceed one another. Thus a line, how ſhort ſoever, may be multiplied, that is produced ſo long as to exceed in length any given right line, and conſequently theſe may be compared together, and the ratio expreſſed; but as a line can never, by any multiplication whatever, be made to have breadth, that is, to be made equal to a ſuperficies, how ſmall ſoever; theſe can therefore never be compared together, and conſequently have no ratio or reſpect one to another, according to quantity; that is, as to how often the one contains, or is contained in another. See the article PROPORTION.

RATIOCINATION, *Ratiocinatio*, the act of reaſoning. See REASONING.

RATION, or RATIAN, in the army, a portion of ammunition, bread, drink, and forage, diſtributed to each ſoldier in the army, for his daily ſubſiſtence, &c. The horſe have rations of hay and oats when they cannot go out to forage. The rations of bread are regulated by weight. The ordinary ration of a foot ſoldier is a pound and a half of bread per day. The officers have ſeveral rations, according to their quality and the number of attendants they are obliged to keep. When the ration is augmented on occaſions of rejoicing, it is called a double ration. The ſhips crews have alſo their rations or allowances of biſket, pulſe, and water, proportioned according to their ſtock.

RATIONAL, reaſonable. See REASON.

RATIONAL is alſo applied to integral, fractional, and mixed numbers: thus we ſay, rational fractions, rational integer, and rational mixt number; for the explanation and doctrine of which, ſee NUMBER and FRACTION.

RATIONALE, a ſolution, or account of the prin-

principles of ſome opinion, action, hypotheſis, phænomenon, or the like.

RATLINES, or, as the ſeamen call them, RATLINS, thoſe lines which make the ladder ſteps to get up the ſhrouds and puttocks, hence called the ratlings of the ſhrouds.

RATTLE-SNAKE, *Crotalophorus*, in zoology, a genus of ſerpents, having ſcuta that cover the whole under-ſurface of the body and tail, and having the extremity of the body terminated by a kind of rattle, formed of a ſeries of urceolated articulations, which are moveable, and make a noiſe.

Of this ſerpent, there are two ſpecies, the greater one with the ſcuta of the abdomen a hundred and ſeventy-two, of the tail twenty-one; and the leſſer rattle-ſnake, having the ſcuta of the abdomen a hundred and ſixty-five, of the tail twenty-eight. The larger is a very terrible, and at its full growth, a very large ſerpent, growing to eight feet in length, with a proportionable thickneſs: the head is large, broad, depreſſed, and of a pale brown: the iris of the eye is red; the back is of a brown colour, with an admixture of a ruddy yellow, and variegated with a great many irregular tranſverſe liſts, of a deep black; the belly is of a paliſh blue: the rattle is of a firm, and as it were of a horny ſubſtance, and brown colour, compoſed of a number of cells, which are articulated one within another, which articulations being very looſe, the included points ſtrike againſt the inner ſurface of the rings they are admitted into, and make that rattling noiſe, when the ſerpent vibrates, or ſhakes its tail. This ſerpent is frequent in the woods of America: the bite is fatal, but it is eaſy to avoid it, the creature being ſluggiſh, moving ſlowly, never attacking a man unleſs provoked, and giving notice before it bites by ſhaking its rattle.

The leſſer ſpecies of this ſerpent grows to about ſeven feet in length, and in moſt particulars is like the former one, and its bite is equally miſchievous.

RATTLE-SNAKE-ROOT, the ſame with the ſenega, a ſpecies of the polygala. See the article POLYGALA.

RAUCEDO, hoarſeneſs, in medicine. See the article HOARSENESS.

RAVELIN, in fortification, was anciently a flat baſtion, placed in the middle of a curtin; but now a detached work compoſed only of two faces, which make a ſaliant angle, without any flanks, and raiſed before the curtin on the counterſcarp of the place. A ravelin is a triangular work, reſembling the point of a baſtion, with the flanks cut off.

RAVEN, in ornithology, a ſpecies of the curvus, of the bigneſs of a common hen, of a black colour, with a blue back: the head is ſmall, depreſſed on the crown, and flatted on both ſides: the eyes are large, bright and piercing; the beak is conſiderably long, and ſomewhat ridged on the back, and ſharp at the point.

RAVISHMENT, in law, denotes an unlawful ſeducing either of a woman, or an heir that is in ward: ſometimes it is alſo uſed in the ſame ſenſe as a rape.

RAUVOLFIA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is cylindrical and globoſe at the baſe, and the limb is divided into five roundiſh emarginated ſegments. The fruit is a ſubgloboſe, unilocular drupe, containing a bilocular nut, convex at the baſe, and depreſſed at the top.

RAY, in optics, a beam of light, emitted from a radiant, or luminous body. See LIGHT.

RAYONANT, or *Croſs* RAYONANT, in heraldry, one which has rays of glory behind it, darting out from the center to all the quarters of the eſcutcheon.

RE, in grammar, an inſeparable particle added to the beginning of words, to double, or otherwiſe modify their meaning; as in re-action, remove, re-export, &c.

REACH, in the ſea-language, ſignifies the diſtance between any two points of land, lying nearly in a right line.

RE-ACTION, in phyſiology, the reſiſtance made by all bodies to the action or impulſe of others, that endeavour to change its ſtate, whether of motion or reſt. See the articles ACTION and MOTION.

REALISTS, *Realiſtæ*, a ſect of ſchool philoſophers, formed in oppoſition to the nominaliſts. See NOMINALISTS.

Under the realiſts are included the Scotiſts, Thomiſts, and all excepting the followers of Ocham. Their diſtinguiſhing tenet is, that univerſals are realities, and have an actual exiſtence out of an idea, or imagination; or, as they expreſs it in the ſchools, a *parte rei*; whereas the nominaliſts contend that they only exiſt in the mind, and are only ideas, or manners of conceiving things.

REAR, a term frequently uſed in compoſition, to denote ſomething behind, or backwards, in reſpect of another, in oppoſition to van: thus, in a military ſenſe, it is uſed for the hind part of an army, in oppoſition to the front. For the rear-guard, rear-half-files, rear-line, rear-rank, and rear-admiral, ſee GUARD, FILE, LINE, RANK, and ADMIRAL.

REASON, *Ratio*, a faculty, or power of the mind, whereby it diſtinguiſhes good from evil, truth from falſhood; whereby man is diſtinguiſhed from beaſts; and wherein it is evident he greatly ſurpaſſes them: or, reaſon is that principle, whereby, comparing ſeveral ideas together, we draw conſequences from the relations they are found to have. See REASONING.

REASON is alſo taken in different other ſignifications; ſometimes it denotes true and clear principles; ſometimes it is taken for clear and fair de-

deductions from these principles; and sometimes for the cause,, particularly the final cause.

REASONING, ratiocination, the exercise of that faculty of the mind called reason; or it is an act or operation of the mind, deducing some unknown proposition from other previous ones that are evident and known.

It often happens in the comparing ideas together, that their agreement or disagreement cannot be discerned at first view, especially if they are of such a nature as not to admit of any exact application to one another: here then, as has been already observed under REASON, it becomes necessary to look out some third idea that will admit of such an application as the present case requires. Hence it appears that every act of reasoning necessarily includes three distinct judgments, two wherein the ideas whose relation we want to discover, are severally compared with the middle idea, and a third wherein they are themselves connected, or disjoined according to the result of that comparison. Now as our judgments when put into words are called propositions, so the expressions of our reasonings are termed syllogisms. And hence it follows that as every act of reasoning implies three several judgments, so every syllogism must include three distinct propositions. See the article SYLLOGISM.

In order therefore to infer a conclusion by a single act of reasoning, the premises must be intuitive propositions where, they are not, previous syllogisms are required, in which case reasoning becomes a complicated act taken in a variety of successive steps. This frequently happens in tracing the more remote relations of our ideas, where many middle terms being called in, the conclusion cannot be made out, but in consequence of a series of syllogisms following one another in train. Hence we may clearly perceive that reasoning, in the highest exercise of that faculty, is no more than an orderly combination of simple acts of reasoning. See DEMONSTRATION.

Thus we see that reasoning, beginning with first principles, rises gradually from one judgment to another, and connects them in such a manner that every stage of the progression brings intuitive certainty along with it.

REAUMURIA, in botany, a genus of plants, whose corrolla consists of five oblong equal petals, which are recurved at their tops; the filaments are numerous and topped with roundish antheræ; the fruit is an ovate capsule, having five valves, and five cells containing a great many oblong seeds.

REBATE, or REBATEMENT, in commerce, a term much used at Amsterdam, for an abatement in the price of several commodities, when the buyer, instead of taking time, advances ready money.

REBATEMENT, in heraldry, a diminution or abatement of the bearings, in a coat of arms. See ABATEMENT.

REBELLION, a traiterous taking up of arms against the king by his own natural subjects, or those formerly subdued.

REBELLIOUS-ASSEMBLY, in law, an assembling together of twelve or more persons, with an intent of unlawfully making use of their own authority, to change or alter any laws of this kingdom, or to destroy the inclosures of any ground, or the banks of any fish-pond, pool, or conduit, to the intent that it may lie waste and void; or to destroy, the deer in any park, fish in fish-ponds, coneys in any warren; or any house, barn, mills, or bays; or to burn sacks of corn, abate rents, or prices of victuals, &c. See the article RIOT.

REBUS, an ænigmatical representation of some name &c. by using figures or pictures instead of words, or parts of words.

REBUTTER, in law, the defendant's answer to the plaintiff's surrejoinder, in a cause depending in the court of chancery, &c.

RECAPITULATION, in oratory, &c. a part of the peroration.

Recapitulation is a summary, or a concise and transient enumeration of the principal things insisted on in the preceding discourse, whereby the force of the whole is collected into one view.

RECEIPT, or RECEIT, in commerce, an acquittance, or discharge, in writing, intimating that the party has received a certain sum of money, either in full for the whole debt, or in part, or on account.

RECEIPT, in book-keeping, is an account of all the money and goods received. See the article BOOK.

RECEIPT, in medicine. See RECIPE.

RECEIVER, in chemistry, a vessel of earth, glass, &c. for receiving any distilled liquor.

RECEIVER, in Pneumatics, a glass-vessel for containing the thing on which an experiment in the air-pump is to be made. See AIR-PUMP.

RECEPTACLE, among botanists, is the base which supports either the flower, fruit, or seeds; in respect to its form it is either flat, concave, convex, globular, conic, or pyramidal; and with regard to its surface, it is either naked, punctated, villose, bristly or paleaceous,

RECEPTACULUM CHYLI, or PECQUET'S RESERVATORY, the reservoir or receptacle for the chyle, situated in the left side of the upper vertebra of the loins, under the aorta, and the vessels of the left kidney.

RECHABITES, a kind of religious order among the antient Jews, instituted by Jonadab, the son of Rechab, comprehending only his own family and posterity.

Their founder prescribed them three things: first, not to drink any wine; secondly, not to build any houses, but to dwell in tents; and thirdly, not to sow any corn, or plant wines. These rules the Rechabites observed with great strictness.

RECHEAT, in hunting, a lesson which the huntsmen play on the horn, when the hounds have lost their game, to call them back from pursuing a counter-scent.

RECIPE, in medicine, a prescription or remedy, to be taken by a patient; so called, because always beginning with the word *recipe*, *i. e. take*; which is generally denoted by the abbreviature R.

For the rules proper to be observed in forming recipes, see PRESCRIPTION.

RECIPIANGLE, or RECIPIENT-ANGLE, a mathematicel instrument, serving to measure re-entering and saliant angles, especially in fortification.

RECIPIENT, the same with receiver. See the article RECEIVER.

RECIPROCAL, in general, something that is mutual, or which is returned equally on both sides, or that affects both parties alike.

RECIPROCAL TERMS, among logicians, are those which have the same signification; and consequently are convertible, or may be used for each other.

RECIPROCAL FIGURES, in geometry, those which have the antecedents and consequents of the same ratio, in both figures.

RECIPROCAL PROPORTION, in arithmetic, is when in four numbers, the fourth is less than the second, by so much as the third is greater than the first; and *vice versa*. See the article PROPORTION.

RECITATIVO, or RECITATIVE, in music, a kind of singing, that differs but little from ordinary pronunciation, such as that in which the several parts of the liturgy are rehearsed in cathedrals; or that wherein the actors commonly deliver themselves on the theatre at the opera, when they are to express some action or passion, to relate some event, or reveal some design.

RECKONING, or, *a Ship's* RECKONING, in navigation, is that account whereby at any time it may be known where the ship is, and on what course or courses she is to steer, in order to gain her port; and that account taken from the log-board is called the dead-reckoning. See LOG-BOARD, JOURNAL, &c.

RECLUSE, among the papists, a person shut up in a small cell of an hermitage, or monastery, and cut off, not only from all conversation with the world, but even with the house. This is a kind of voluntary imprisonment, from a motive either of devotion or penance.

The word is also applied to incontinent wives, whom their husbands procure to be thus kept in perpetual imprisonment in some religious house.

Recluses we antiently very numerous; they took an oath, never to stir out of their retreat; and having entered it, the bishop set his seal upon the door; and the recluse was to have every thing necessary for the support of life, conveyed to him through a window.

RECOGNITION, in law, an acknowledgment; a word particularly used in our law-books, for the first chapter of the statute 1 Jac. I. by which the parliament acknowledged, that, after the death of queen Elizabeth, the crown had rightfully descended to king James.

RECOGNIZANCE, or RECOGNISANCE, in law, a bond or obligation of record, acknowledged to the king; thus called, because recognized or acknowledged in some court of record, or before some judge, master in chancery, or justice of the peace.

The party bound in a recognizance, is called recognizor; and the person to whom he is bound, is termed the recognizee.

RECOIL, or REBOUND, the starting backward of a fire-arm, after an explosion.

Mersennus tells us, that a cannon 12 feet in length, weighing 6400 lb. gives a ball of 24 lb. an uniform velocity of 640 feet per second. Putting therefore, $W = 6400$ $w = 24$, $V = 640$, and $v =$ the velocity with which the cannon recoils; we shall have (because the momentums of the cannon and ball are equal) $Wv = wV$; and so $v = \frac{wV}{W} = \frac{24 \times 64}{6400} = 2, 4$; that is, it would recoil at the rate of $2\frac{4}{10}$ feet per second, if free to move. See GUNNERY and PROJECTILE.

RECOLLECTION, a mode of thinking, by which ideas sought after by the mind, are found, and brought again to view.

RECOLLECTS, a congregation of reformed Franciscans, called also friars-minors of St. Francis, of the strict observance. See FRANCISCANS.

RECONNOITRE, in war, to view and examine the state and situation of things.

RECORD, an authentic testimony in writing, contained in rolls of parchment, and preserved in a court of record.

Records are said to be of three kinds, viz. a record judicial, an attainder, &c. a record ministerial, upon oath, as an office or inquisition found; and a record made by conveyance and consent, as a fine, &c.

RECORDER, a person whom the mayor and other magistrates of a city or corporation associate to them, for their better direction in matters of justice, and proceedings in law; on which account this person is generally a counsellor, or other person well skilled in the law.

RECOVERY, in law, is obtaining any thing by judgment or trial at law.

RECREMENT, in chemistry, some superfluous matter separated from some other that is useful; in

in which ſenſe it is the ſame with ſcoriæ, fæces, and excrements. See the article SCORIÆ, &c.

RECRIMINATION, in law, an accuſation brought by the accuſed againſt the accuſer, upon the ſame fact. See the article ACCUSATION.

RECRUITS, in military affairs, new-raiſed ſoldiers, deſigned to ſupply the place of thoſe who have loſt their lives in the ſervice, or are diſabled by age or wounds.

RECTANGLE, in geometry, the ſame with a right-angled parallelogram. See the article PARALLELOGRAM.

In arithmetic and algebra, a rectangle ſignifies the ſame with factum or product. See the articles PRODUCT and MULTIPICATION.

RECTANGLED, RECTANGULAR, or RIGHT-ANGLED, appellations given to figures and ſolids which have one or more right angles: thus a triangle with one right angle, is termed a rectangled triangle; alſo parellelograms with right angles, ſquares, cubes, &c. are rectangular.

Solids, as cones, cylinders, &c. are alſo ſaid to be rectangular, with reſpect to their ſituation, when their axes are perpendicular to the place of the horizon.

The ancient geometricians always called the parabola, the rectangular ſection of a cone. See the articles CONIC SECTIONS and PARABOLA.

RECTIFICATION, the art of ſetting any thing to rights: and hence, to rectify the globes, is to fit them for performing any problem. See the article GLOBE.

RECTIFICATION, in geometry, is the finding a right line, equal in length to a curve. See the article CURVE.

RECTIFIER, in navigation, an inſtrument conſiſting of two parts, which are two circles either laid one upon, or let into, the other, and ſo faſtened together in their centers, that they repreſent two compaſſes, one fixed, the other moveable; each of them divided into the thirty-two points of the compaſs, and three hundred and ſixty degrees, and numbered both ways, from the north and the ſouth, ending at the eaſt and weſt, in ninety degrees.

The fixed compaſs repreſents the horizon, in which the north and all the other points of the compaſs are fixed and immoveable.

The moveable compaſs repreſents the mariners compaſs, in which the north and all other points are liable to variation.

In the center of the moveable compaſs is faſtened a ſilk thread, long enough to reach the outſide of the fixed compaſs. But, if the inſtrument be made of wood, there is an index inſtead of the thread.

Its uſe is to find the variation of the compaſs, to rectify the courſe at ſea; having the amplitude or azimuth given.

RECTILINEAR, in geometry, right-lined; thus figures whoſe perimeter conſiſts of right lines, are ſaid to be rectilinear.

RECTOR, a term applied to ſeveral perſons whoſe offices are very different: as, 1. The rector of a pariſh is a clergyman that has the charge and cure of a pariſh, and poſſeſſes all the tythes, &c. 2. The ſame name is alſo given to the chief elective officer in ſeveral foreign univerſities, particularly in that of Paris. 3. Rector is alſo uſed in ſeveral convents for the ſuperior officer who governs the houſe; and the Jeſuits give this name to the ſuperiors of ſuch of their houſes as are either ſeminaries or colleges.

RECTORY, a pariſh-church, parſonage, or ſpiritual living, with all its rights, tythes and glebes.

Rectory is alſo uſed for the rector's manſion or parſonage-houſe.

RECTUM, in anatomy, the third and laſt of the large inteſtines, or guts. See INTESTINES.

The rectum is in length about three hands breadth, and its diameter about three fingers. It has its beginning at the loweſt vertebræ of the loins, and at the lower end is the anus. See ANUS.

It is connected to the os ſacrum, the os coccygis, and the urinary bladder in men; but in women to the vagina uteri. The coats of the rectum are more thick and fleſhy than thoſe of any other of the inteſtines: it has in general no valves, but it has ſeveral rugæ: the abſence of valves here, is to prevent the expulſion of the fœces from being retarded.

RECTUS, in anatomy, a name common to ſeveral pair of muſcles, ſo called on account of the ſtraightneſs of their fibres, as, 1. The rectus major anticus, which ariſes from the tranſverſe apophyſes of the five lower vertebræ of the neck, and is inſerted in the os occipitis. 2. The rector minor anticus, called, by Cowper, muſculus annuens; this ariſes from the anterior ſurface of the atlas, or firſt vertebra of the neck; and lies concealed, as it were, under the former, till it is at length inſerted a little behind it, into the os occipitis: theſe two pair of muſcles ſerve to move the head forward. 3. The rectus major poſticus, one of the extenſors of the head, which has its origin from the ſpinoſe apophyſis of the epiſtrophæus, and is inſerted into the os occipitis. 4. The rectus minor poſticus, which is alſo one of the five extenſors of the head, has its riſe from the poſterior part of the atlas, and its end under the former. 5. The rectus lateralis, which ſerves to bend the head on one ſide, has its origin from the upper ſurface of the tranſverſe apophyſis of the atlas: from this it aſcends ſtrait with a ſhort body, but conſiderably thick; and is inſerted partly into the os occipitis, and partly into the temporal bone, near the inciſure of the maſtoide proceſs. 6. The rectus tibiæ, one of the four extenſors of the leg, which has its origin from the anterior and inferior ſpine of the ileum.

RECTUS IN CURIA, in law, one who ſtands at the

the bar, and no man objects any thing againſt him. So alſo when a perſon who has been outlawed has reverſed the outlawry, and can partake of the benefit of the law, he is ſaid to be rectus in curia.

RECURRENTS, in anatomy, a name given to ſeveral large branches of nerves ſent out by the par vagum from the upper part of the thorax to the larynx.

RECUSANTS, ſuch perſons as acknowledge the pope to be the ſupreme head of the church, and refuſe to acknowledge the king's ſupremacy; who are hence called popiſh recuſants. Theſe are in England charged with double taxes, not merely as Romaniſts, but as recuſants.

RED, in phyſics, one of the ſimple or primary colours of natural bodies, or rather of the rays of light. See COLOUR, LIGHT, and RAY.

RED, in dying, is one of the five ſimple or mother colours: ſome reckon ſix kinds or caſts of red, viz. ſcarlet-red, crimſon-red, madder-red, half-grain-red, lively-orange-red, and ſcarlet of cochineal: but they may be all reduced to the three following, according to the three principal drugs which give the colours, viz. the kermes, cochineal, and madder. See the articles KERMES, COCHINEAL, and MADDER.

For the ſcarlet and crimſon reds, ſee SCARLET and CRIMSON.

Madder-red is made with madder, to which ſome add realgal and arſenic; others common ſalt, or other ſalts, with wheat-flour; or agaric, with ſpirit of wine, galls, or turmeric. The half-grain is made with agaric and bran-water; half-ſcarlet-grain, half madder, and ſometimes turmeric. As to the lively orange-red, the ſtuff muſt be firſt put in yellow, then in a liquor made of goats hair, which has been boiled ſeveral times with madder, and now diſſolved over the fire with certain acids, as urine, tartar, &c.

Beſides theſe reds, which are good and allowed colours, there is alſo a Brazil red, which is diſcouraged as fading eaſily.

Of the ſix good reds, only four have particular caſts or ſhades, the madder-red, the crimſon-red, the lively orange-red, and the ſcarlet of cochineal: the caſts or ſhades of crimſon are freſh-colour, peach-colour, carnation-roſe-colour, and an apple-tree-flower-colour: thoſe of madder are a freſh-colour, onion-peel-colour, and flame-colour: thoſe of the orange are the ſame with that of the crimſon: ſcarlet, beſides the ſhades of all the reſt, has ſome peculiar to itſelf, as cherry-colour, fire-colour, &c.

RED, in painting. For painting in oil-colours, they uſe a red called cinnabar, or vermilion, and another called Lacca.

In limning and freſco, for a violet-red, inſtead of lacca they uſe reddle, a natural earth found in England: for a brown, they uſe ochre.

RED, in heraldry. See GULES.

RED-BOOK *of the Exchequer*, an ancient record or manuſcript volume, in the keeping of the king's remembrancer, containing divers miſcellany treatiſes relating to the times before the conqueſt.

REDDLE, a ſoft, heavy, red marle, of great uſe in colouring; and being waſhed and freed from its ſand, is often ſold by our druggiſts under the name of bole-armenic.

REDEEMABLES, are lands, funds, &c. ſold with a reſervation of the equity of redemption. See REDEMPTION.

REDELIVER, the yielding and delivering a thing back, which in caſe of a robbery, &c. does not purge the offence.

REDEMISED, ſignifies the granting back of lands demiſed or leaſed.

REDEMPTION, in law, a faculty or right of re-entering upon lands, &c. that have been ſold and aſſigned, upon re-imburſing the purchaſe money with legal coſts.

Bargains wherein the faculty, or, as ſome call it, the equity, of redemption is reſerved, are only a kind of pignorative contracts. A certain time is limitted within which the faculty of redemption ſhall be exerciſed, and beyond which it ſhall not extend.

In our old law-writers, redemption denoted ſome grievous mulct, impoſed by way of commutation for the head or life of the delinquent.

REDENS, REDANS, or REDANT, in fortification, a kind of work indented in form of the teeth of a ſaw, with ſalient and re-entering angles, to the end that one part may flank or defend another. It is called ſaw-work and indented work. The faces in this, flank one another.

Redens are frequently uſed in the fortifying of walls, where it is not neceſſary to be at the expence of building baſtions; as when they ſtand on the ſide of a river, a marſh, the ſea, &c.

REDOUBT, or REDOUTE, *Reductus*, in fortification, a ſmall ſquare fort, without any defence but in front, uſed in trenches, lines of circumvallation, contravallation, and approach, as alſo for the lodgings of the corps-de-garde, and to defend paſſages. In marſhy grounds, redoubts are frequently made of ſtone-works, for the ſecurity of the neighbourhood; their face conſiſts of from ten to fifteen fathom, the ditch round them from eight to nine feet broad and deep, and their parapets have the ſame thickneſs.

REDUCT, or REDUIT, a military term ſignifying an advantageous piece of ground, entrenched, and ſeparated from the reſt of the place, camp, &c. for an army, garriſon, &c. to retire to in caſe of a ſurprize.

REDUCT, in building, a quirk or little place taken out of a larger to make it more uniform and

regular; or for ſome other convenience, as for a little cabinet, a ſide of a chimney, for alcoves, &c.

REDUCT, or REDUX, among chemiſts, a powder by which calcined metals and minerals are again reduced to their regulus, or pure ſubſtance. See REGULUS.

REDUCTION, *Reductio*, in the ſchools, a manner of bringing a term or propoſition which was before oppoſite to ſome other, to be equivalent to it.

REDUCTION *of Syllogiſms*, is a regular changing or transforming of an imperfect ſyllogiſm into a perfect one; or it is a change of a ſyllogiſm in reſpect of form whereby the neceſſity of the illation or inference is made more evident. See the article SYLLOGISM.

REDUCTION, in arithmetic, that rule whereby numbers of different denominations are brought into one denomination.

Reduction is but the application of multiplication and diviſion. For, firſt, a higher denomination is brought into a lower one, by multiplying the higher denomination with ſo many of the lower, as are contained in the higher; ſtill keeping them equivalent in value. This is called reduction deſcending. Secondly, a lower or inferior denomination is reduced into a higher or ſuperior one, by dividing the leſſer one with ſo many of its denomination as is contained in the greater. This is the converſe of the laſt, and is termed reduction aſcending.

Thus pounds are reduced into ſhillings by multiplying with 20; ſhillings into pence, by multiplying with 12; and pence into farthings, by multiplying with 4. On the other hand, ſhillings are reduced into pounds, by dividing with 20; pence into ſhillings, by dividing with 12; and farthings into pence by dividing with 4.

Examples. Let it be required to reduce 357l. into ſhillings, and thoſe ſhillings into pence; 357 ×20=7140= the ſhillings in 357l. and 7140×12 =85680= the pence in 357l. as was required. Again, let it be required to reduce 85680d. into ſhillings, and thoſe ſhillings into pounds; 85680÷ by 12=7140= the ſhillings in 357l. and 7140÷ by 20=357l. as was required.

If there remain any thing in each diviſion, it is reſpectively either odd pence, ſhillings, or farthings; thus 4123788 farthings being reduced, give 4295l. 12s. 3d.

But when the numbers propoſed to be reduced are of ſeveral denominations, and it is required to bring them all to the loweſt, you muſt reduce, as before, the higheſt or greateſt denomination to the next leſs, adding the numbers that are of that next denomination together; then reduce their ſum to the next lower denomination; adding together all the numbers that are of that denomination, and ſo proceed gradually on until all is done.

To expedite the practice of this rule, ſeveral compendious ways of reduction have deen invented. See PRACTICE.

REDUCTION *of Fractions*. See the article FRACTION.

REDUCTION *of Equations*, in algebra. See the article EQUATION.

REDUCTION *of Curves*. See the article CURVE.

REDUCTION *of a Figure, Deſign, or Draught*, is the making a copy thereof, either larger or ſmaller than the original; ſtill preſerving the form and proportion. The great uſe of the proportional compaſſes is the reduction of figures, &c. whence they are called compaſſes of reduction.

REDUCTION *to the Ecliptic*, in aſtronomy. The place of any ſtar reduced to the ecliptic, is that point where the ſecundary paſſing through the ſtar interſects the ecliptic.

REDUCTION, in metallurgy, is the bringing back metalline ſubſtances which have been changed into ſcoriæ or aſhes, or otherwiſe diveſted of their metallic form, into their natural and original ſtate of metals again. All metals and ſemi-metals may be reduced by proper management, whatever have been their changes, except only zink, which having been burnt to aſhes, admits of no reduction; but the mixture of gold and ſilver was never yet radically diſſolved by any experiment, whatever ſome may have imagined. Even ſome earths will turn into metals by the admixture and intimate union of a phlogiſtion or inflammable principle.

REDUCTION, in ſurgery denotes an operation whereby a diſlocated, luxated, or fractured bone is reſtored to its former ſtate or place. See the articles LUXATION and FRACTURE.

REDUNDANT HYPERBOLA, is a curve of the higher kind, thus called becauſe it exceeds the conic ſection of that name, in the number of its hyperbolical legs; being a triple hyperbola with ſix hyperbolical legs.

REDUPLICATION, in logic, a kind of condition expreſſed in a propoſition indicating, or aſſigning the manner wherein the predicate is attributed to the ſubject. Hence reduplicative propoſitions, are ſuch wherein the ſubject is repeated with ſome circumſtance or condition. Thus, *men, as men, are rational: kings, as kings, are ſubject to none but God.*

REED, an antient Jewiſh meaſure. See the article MEASURE.

REED, *Arundo*, in botany, a genus of gramineous plants; the flowers grow in ſpikes, the corolla of which conſiſts of two oblong acuminated valves, having a down at their baſe, which riſes almoſt their length: the ſtamina are three capillary filaments, topped with horned antheræ; there is no pericarpium, but the corolla contains a ſingle oblong

oblong pointed ſeed, with a long down adhering to its baſe.

The common reed grows in plenty by the ſides of rivers and large ſtanding waters, in many parts of England: they are cut in autumn, and applied to many uſes. To this genus belong the bamboe, which grows in plenty in the Eaſt-Indies. See the article BAMBOE.

REEF, a term in navigation. When there is a great gale of wind, they commonly roll up part of the ſail below, that by this means it may become the narrower, and not draw ſo much wind; which contracting or taking up the ſail they call a reef, or reefing the ſail: ſo alſo when a top-maſt is ſprung, as they call it, that is, when it is cracked, or almoſt broken in the cap, they cut off the lower piece that was near broken off, and ſetting the other part, now much ſhorter, in the ſtep again, they call it a reefed top-maſt.

REEL, in the manufactories, a machine ſerving for the office of reeling.

REELING, in the manufactories, the winding of thread, ſilk, cotton, or the like, into a ſkain, or upon a bottom, to prevent its entangling. It is alſo uſed for the charging or diſcharging of bobbins or quills, to uſe them in the manufacture of different ſtuffs, as thread, ſilk, cotton, &c. Reeling is performed different ways, and on different engines.

RE-ENTRY, in law, ſignifies the reſuming or retaking that poſſeſſion which any one had lately forgone; as where a perſon makes a leaſe of lands to another, the leſſor thereby quits the poſſeſſion, and if the leſſee covenants that upon non-payment of the rent reſerved, the leſſor may lawfully re enter, being as much as if it was conditioned for the leſſor to take the land again into his hands, and recover the poſſeſſion again by his own act without the aſſiſtance of the law. Likewiſe, if a leaſe for years be made, with condition that if the leſſee aſſign his terms, the leſſor may re-enter, and the leſſee, in breach of the condition, aſſigns unknown to the leſſor, who accepts of rent from the aſſignee without notice of the aſſignment, in that caſe it is held the leſſor may re-enter, notwithſtanding his acceptance of the rent.

REEVE *of a Church*, the guardian of it, or the churchwarden. See CHURCH.

REEVING, in the ſea language, the putting a rope through a block: hence, to pull a rope out of a block, is called unreeving.

RE-EXCHANGE, in commerce, a ſecond payment of the price of exchange, or rather the price of a new exchange due upon a bill of exchange that comes to be proteſted and to be refunded the bearer by the drawer or indorſer. See the articles EXCHANGE and BILL.

REFECTION, among eccleſiaſtics, a ſpare meal or repaſt juſt ſufficing for the ſupport of life: hence the hall in convents, and other communities, where the monks, nuns, &c. take their refections or meals, in common, is called the refectory.

REFERENCE, in writing, &c. a mark relative to another ſimilar one in the margin, or at the bottom of the page, where ſomething omitted in the text is added, and which is to be inſerted either in reading or copying. References are alſo uſed in books where things being but imperfectly handled, the reader is directed to ſome other part or place for a further explanation of them. For the uſe of theſe references in a work of this kind, we refer the reader to what has been ſaid upon that ſubject in our introduction to this work.

REFINING, in general, is the art of purifying a thing; including not only the aſſaying or refining of metals, but likewiſe the clarification of liquors. See ASSAYING and CLARIFICATION.

REFLECTING or REFLECTIVE DIAL. See the article DIAL.

REFLECTION, or REFLEXION, in mechanics, the return or regreſſive motion of a moving body, occaſioned by ſome obſtacle which hindered it from purſuing its former direction.

For the laws of the reflection of moving bodies, ſee MOTION, COMMUNICATION *of Motion*, and PERCUSSION.

REFLECTION *of the Rays of Light*, in catoptrics, is their return, after approaching ſo near the ſurfaces of bodies, as to be thereby repelled, or driven back. See the article MIRROUR.

REFLECTION *of the Moon*, the ſame with her variation. See the article VARIATION.

REFLECTION, is alſo uſed, figuratively, for an operation of the mind; whereby it turns its view backwards, as it were, upon itſelf, and makes itſelf and its own operation the object of its diſquiſition; and by contemplating the manner, order, and laws, which it obſerves in perceiving ideas, comparing them together, reaſoning, &c. it frames new ideas of the relations diſcovered therein. See the articles IDEA, KNOWLEDGE, REASONING, &c.

REFLEX, or REFLECT, in painting, is underſtood of thoſe places in a picture which are ſuppoſed to be illuminated by a light reflected from ſome other body, repreſented in the ſame piece.

REFLEX VISION, that performed by means of reflected rays, as from mirrours. See the articles VISION and MIRROUR.

REFLUX *of the Sea*, the ebbing of the water, or its returning from the ſhore. See the article TIDE.

REFORM, a re-eſtabliſhment, or revival, of formerly-neglected diſcipline, or a correction of the reigning abuſes therein.

To REFORM, in a military ſenſe, is to reduce a company, regiment, &c. either by diſbanding the whole, or breaking a part, and retaining the reſt.

RE-

REFORMADO, or REFORMED OFFICER, one whoſe troop, or company, is ſuppreſſed in a reform, and he continued either in the whole or half-pay, doing duty in the regiment.

REFORMATION, the act of reforming, or correcting an error or abuſe in religion, diſcipline, or the like.

The reformation, ſo called by way of eminence, is the ſeparation of the Proteſtants from the church of Rome, in the beginning, and towards the middle, of the ſixteenth century. See the articles LUTHERANS, &c.

REFRACTED or REFRACTIVE DIAL, one that ſhews the hours by means of ſome refractive tranſparent fluid. See DIAL.

REFRACTION, in general, is the deviation of a moving body from its direct courſe, occaſioned by the different denſity of the medium it moves in; or, it is a change of direction, occaſioned by a body's falling obliquely out of one medium, into another of a different denſity.

The great law of refraction, which holds in all bodies, and all mediums, is, that a body, paſſing obliquely out of one medium into another wherein it meets with leſs regſtance, is refracted or turned towards the perpendicular; and, on the contrary, in paſſing out of one medium into another wherein the reſiſtance is greater, it is refracted or turned from the perpendicular. Hence, the rays of light, falling out of air into water, are refracted towards the perpendicular; whereas a ball, thrown into the water, is refracted from it.

Now, the reaſon of this difference is, that water, which reſiſts the motion of light leſs than air, reſiſts that of the ball more; or, to ſpeak more juſtly, becauſe water, by its greater attraction, accelerates the motion of the rays of light more than air does.

REFRACTION, in aſtronomy, the refraction of the rays of light, iſſuing from a heavenly body, in paſſing through the atmoſphere of our earth.

REFRACTION *of Altitude*, is an arch of a vertical circle, whereby the altitude is increaſed by the refraction.

REFRACTION *of Declination*, is an arch of a circle of declination, whereby the declination of the object is either increaſed or diminiſhed by the refraction.

REFRACTION *of Longitude*, is an arch of the ecliptic, whereby the longitude of the object is increaſed or diminiſhed by the refraction.

REFRACTION *of Latitude*, is an arch of a circle of latitude, whereby the latitude of a heavenly object is either increaſed or diminiſhed by its refraction.

REFRACTION *in Iſland Cryſtal.* There is a double refraction in this ſubſtance, contrary ways, whereby not only oblique rays are divided into two, and refracted into oppoſite parts, but even perpendicular rays, and one half refracted.

Cauſtic by REFRACTION. See the article DIACAUSTIC.

REFRANGIBILITY *of Light*, the diſpoſition of rays to be refracted. See LIGHT, RAY, and REFRACTION.

REFRIGERATIVE, in medicine, a remedy which refreſhes the inward parts, by cooling them; as clyſters, ptyſans, &c.

REFRIGERATORY, in chemiſtry, a veſſel filled with cold water, through which the worm paſſes in diſtillations; the uſe of which is to condenſe the vapours, as they paſs through the worm.

REFUGE, a ſanctuary or aſylum. See the article ASYLUM.

REFUGEES, French proteſtants, who by the revocation of the edict of Nantz, have been conſtrained to fly from perſecution and take refuge in foreign countries.

REGAL, or ROYAL, ſomething belonging to a king. See ROYAL.

REGARDANT, in heraldry, ſignifies looking behind, and is uſed for a lion, or other beaſt, with his face turned towards his tail.

REGEL, or RIGEL, a fixed ſtar of the firſt magnitude, in Orion's left foot. See ORION.

REGENERATION, in theology, the act of being born again by a ſpiritual birth, or the change of heart and life; experienced by a perſon who forſakes a courſe of vice, and ſincerely embraces a life of virtue and piety.

REGENT, one who governs a kingdom during the minority or abſcence of the king.

In France, the queen-mother has the regency of the kingdom, during the minority of the king, under the title of queen regent.

REGENT, alſo ſignifies a profeſſor of arts and ſciences in a college, who has a ſet of pupils under his care: but here regent is generally reſtrained to the lower claſſes, as regent of rhetoric, regent of logic, &c. thoſe of philoſophy are rather called profeſſors.

The foreign univerſities are generally compoſed of doctors, profeſſors, and regents.

REGICIDE, king-killer, a word chiefly uſed with us in ſpeaking of the perſons concerned in the the trial, condemnation, and execution, of king Charles I.

REGIMEN, the regulation of diet, and in a a more general ſenſe, of all the non-naturals, with a view to preſerve or reſtore health.

Dr. Mead obſerves, with reſpect to regimen, that diſeaſes from inanition are generally more dangerous than thoſe which proceed from repletion, becauſe we can more expeditiouſly diminiſh than increaſe the juices of the body.

Upon this account, though temperance is beneficial to all men, the ancient phyſicians adviſed perſons in good health to indulge a little now and then, by eating and drinking more plentifully than uſual: but of the two, intemperance in drinking is ſafer than

than in eating; and if a perſon has committed exceſs in the latter, cold water drank upon a full ſtomach will help digeſtion; to which it will be of ſervice to add lemon-juice or elixir of vitriol, if he has eaten high-ſeaſoned things, rich ſauces, &c. Then let him ſit up for ſome time, and afterwards ſleep. But if a man happens to be obliged to faſt, he ought to avoid all laborious work.

From ſatiety it is not proper to paſs directly to ſharp hunger, nor from hunger to ſatiety; neither will it be ſafe to indulge abſolute reſt immediately after exceſſive labour, nor ſuddenly to fall to hard work after long idleneſs. In a word, all changes in the way of living ſhould be made by degrees.

It is alſo beneficial to vary the ſcenes of life, to be ſometimes in the country, ſometimes in town; to go to ſea, to hunt, to be at reſt now and then, but more frequently to uſe exerciſe, and a moderate ſleep. See EXERCISE, and SLEEP.

The paſſions and affections of the mind produce very ſenſible effects. Joy, anger, fear, and ſorrow, are the principal. In joy, or anger, the ſpirits are hurried with too great vivacity; in fear, or dread, they are, as it were, curbed and concentrated; and continual ſorrow and anguiſh of mind, render the fluids of the body thick, and the blood unapt for a due circulation, whence proceed many chronic diſeaſes: it is therefore, on all accounts, as much our intereſt as our duty, to keep the paſſions within due bounds, and to preſerve an inward ſerenity, calmneſs, and tranquility.

REGIMEN, in chemiſtry, ſignifies the due regulation of fire. See FIRE.

REGIMEN, in grammar, that part of ſyntax, or conſtruction, which regulates the dependency of words, and the alterations which one occaſions in another.

REGIMENT, in war, is a body of men, either horſe or foot, commanded by a colonel.

Each regiment of foot is divided into companies, but the number of companies is not always alike, though our regiments generally conſiſt of thirteen companies, one of which is always grenadiers.

Regiments of horſe moſt commonly conſiſt of ſix troops, but ſome have nine.

Regiments of dragoons, in time of war, are generally compoſed of eight troops, and in time of peace, of ſix. Each regiment has a chaplain and a ſurgeon. See TROOP and COMPANY.

Some German regiments conſiſt of two thouſand foot, and the regiment of Picardy in France, conſiſts of 120 companies, or 6000 men.

REGION, in geography, a large extent of land, inhabited by many people of the ſame nation, and incloſed within certain limits or bounds.

The modern aſtronomers divide the moon into ſeveral regions, or large tracts of land, to each of which they give its proper name.

REGION, in phyſiology, is taken for a diviſion of our atmoſphere, which is divided into the upper, middle, and lower regions. See ATMOSPHERE.

REGION, in anatomy, a diviſion of the human body, otherwiſe called cavity, of which anatomiſts reckon three, viz. the upper region, or that of the head; the middle region, that of the thorax or breaſt; and the lower, the abdomen, or belly. See the articles HEAD, THORAX, and ABDOMEN.

REGISTER, a public book, in which is entered and recorded memoirs, acts, and minutes, to be had recourſe to occaſionally, for knowing, and proving matters of fact.

REGISTER, is alſo uſed for the clerk or keeper of a regiſter.

REGISTER SHIPS, in commerce, are veſſels which obtain a permiſſion either from the king of Spain, or the council of the Indies, to traffic in the ports of the Spaniſh Weſt-Indies; which are thus called, from their being regiſtered before they ſail from Cadiz for Buenos Ayres. Each of theſe permiſſions coſt 30,000 pieces of eight; and by the tenor of the cedula, or permit, they are not to exceed 300 tuns; but there is ſuch a good underſtanding between the merchants, and the council of the Indies, that ſhips of 5 or 600 tuns frequently paſs unnoted; and though the quantity and quality of the merchandizes on board are always expreſſed, yet, by means of preſents, the officers both in Spain and the Indies, allow them to load and unload vaſtly more than the permiſſion expreſſes.

REGISTER, in printing, is diſpoſing the forms on the preſs, ſo as that the lines and pages printed on one ſide of the ſheet, fall exactly on thoſe of the other.

REGISTER, among letter-founders, is one of the inner parts of the mould, in which the printing types are caſt.

REGISTERS, in chemiſtry, are holes, or chinks with ſtopples, contrived in the ſides of furnaces, to regulate the fire; that is, to make the heat more intenſe, or remiſs, by opening them to let in the air, or keeping them cloſe to exclude it.

REGISTRY, the office, books, and rolls, in which the proceedings in chancery, or any ſpiritual court, are regiſtered.

REGLET, or RIGLET, in architecture, a flat narrow moulding, uſed chiefly in pannels and compartiments, to ſeparate the parts and members from one another, and to form knots, frets, and other ornaments.

REGLETS, or RIGLETS, in printing, are thin ſlips of wood, exactly plained to the body of the letter.

The ſmaller ſorts are placed between the lines of poetry, and both thoſe and the larger are uſed in filling up ſhort pages, in forming the whites or diſtances between the lines of titles, and in adjuſting the

the diſtances of the pages in the chaſe, ſo as to form regiſter.

REGRATOR, or REGRATER, in law, formerly ſignified one who bought wholeſale, or by the great, and ſold again by retail; but the term is now uſed for one who buys any wares or victuals, and ſells them again in the ſaid market, or fair, or within five miles round it. See the article FORESTALLING.

REGRATOR, is alſo uſed for one who furbiſhes up old moveables to make them paſs for new. And maſons, who take off the outward ſurface of hewn ſtone, in order to whiten it, or make it look freſh again, are ſaid to regrate.

REGULAR, denotes any thing that is agreeable to the rules of art: thus, we ſay a regular building, verb, &c. See the articles BUILDING, VERB, &c.

A regular figure, in geometry, is one whoſe ſides, and conſequently angles, are equal; and a regular figure with three or four ſides, is commonly termed an equilateral triangle, or ſquare, as all others with more ſides are called regular polygons. See the articles TRIANGLE, SQUARE, and POLYGON.

REGULAR *Curves*, ſuch as proceed gradually in the ſame geometrical manner, with regard to their curvities. See the article CURVE.

REGULAR, in a monaſtery, a perſon who has taken the vows; becauſe he is bound to obſerve the rules of the order he has embraced. See MONK.

REGULAR *Prieſt*, a prieſt in ſome religious order; in contradiſtinction to a ſecular prieſt, or one that lives in the world at large. See PRIEST.

REGULATION, a rule or order preſcribed by a ſuperior, for the proper management of ſome affair.

REGULATOR *of a Watch*, the ſmall ſpring belonging to the ballance; ſerving to adjuſt its motions, and make it go faſter or ſlower. See the article WATCH.

REGULUS, in chemiſtry, an imperfect metallic ſubſtance, that falls to the bottom of the crucible, in the melting of ores, or impure metallic ſubſtances.

REGULUS, in aſtronomy, a ſtar of the firſt magnitude, in the conſtellation Leo, called alſo from its ſituation, *cor leonis*, or, the lion's heart.

REHEARSAL, in muſic, and the drama, an eſſay or experiment of ſome compoſition generally made in private, previous to its repreſentation or performance in public, in order to render the actors and performers more perfect in their parts.

REIMBURSEMENT, in commerce, the act of repaying another the expences he has been at on our account.

REIN-DEER, in zoology, a ſpecies of the cervus, with horns ramoſe and cylindric, with their tops palmated.

This is a large and beautiful ſpecies, not inferior to the elk in ſize or ſtrength, but greatly exceeding it in form; it is of the ſize of a ſmall horſe, but its ſhape is exactly that of the red deer. It is a native of the northern regions, there being no country ſo far north as not to afford it, where it is of vaſt uſe to the inhabitants, as a beaſt of draught.

REINFORCED, or REINFORCED RING, of a cannon, is the next after the trunnions, betwixt them and the touch-hole.

REINFORCEMENT, in war, a freſh ſupply of men, arms, ammunition, &c.

REINS, in anatomy, the ſame with kidneys. See KIDNEYS.

REINS *of a Bridle*, are two long ſlips of leather, faſtened on each ſide of a curb or ſnaffle, which the rider holds in his hand, to keep his horſe in ſubjection.

REJOINING, in architecture, filling up the joints of the ſtones in buildings. This ought to be performed with the beſt mortar, as that of lime and cement, and ſometimes with plaſter, as in the joints of vaults.

REJOYNDER, or REJOINDER, in law, is the defendant's anſwer to the plaintiff's replication or reply. Thus, in the court of chancery, the defendant puts in an anſwer to the plaintiff's bill, which is ſometimes alſo called an exception; the plaintiff's anſwer to this is called a replication, and the defendant's anſwer to that a rejoinder.

RELAPSE, a falling again into a danger, evil, or diſeaſe, from which a perſon has eſcaped.

RELATION, *Relatio*, in philoſophy, the mutual reſpect of two things, or what each is with regard to the other.

RELATION, among the antient logicians, conſtituted one of the ten categories, or predicaments.

RELATION, in geometry, ſignifies the ſame with ratio. See RATIO.

RELATION, in grammar, is the correſpondence which words have to one another in conſtruction.

RELATION is alſo uſed for analogy. See the article ANALOGY.

RELATION, in law, is where two times, or other things, are conſidered as if they were one and the ſame; and by this the thing ſubſequent is ſaid to take its effect, by relation, from the time preceding: thus, in caſe of a deed of bargain and ſale inrolled, the inrollment ſhall have relation to the delivery thereof; and in our courts, a judgment has always relation to the firſt day of term.

RELATIVE, ſomething relating to, or reſpecting another. See the preceding article.

RELATIVE TERMS, in logic, are words which imply a relation: ſuch are maſter and ſervant, huſband and wife, &c.

RELAXATION, in medicine, &c. the act of looſening or ſlackening, or the looſeneſs and ſlackneſs of the fibres, nerves, muſcles, &c.

RELAY, a ſupply of horſes placed on the road, and appointed to be ready for a traveller to change in order to make the greater expedition.

RELAY, in tapeſtry, is an opening left, where the colours and figures are to be changed, when the piece is finiſhed.

RELEASE, in law, is an inſtrument in writing, by which eſtates, rights, titles, entries, actions, and other things, are extinguiſhed and diſcharged; and ſometimes transferred, abridged, or enlarged: and in general, it ſignifies one perſon's giving up or diſcharging the right of action he has, or claims to have, againſt another, or his lands, &c.

RELICS, in the Romiſh church, the remains of the bodies or cloaths of ſaints or martyrs, and the inſtruments by which they were put to death, devoutly preſerved in honour to their memory; kiſſed, revered, and carried in proceſſion.

This is a piece of ſuperſtition which began very early in the Chriſtian church, and at preſent makes no inconſiderable article of popery.

RELICT, in law, the ſame with widow. See the article WIDOW.

RELIEVE, in a military ſenſe, is to ſend off thoſe men that are upon duty, and to bring others to take their place: thus, to relieve the guard, the trenches, &c. is to bring freſh men upon duty, and to diſcharge thoſe who were upon duty before.

RELIEVO, or RELIEF, in ſculpture, &c. is the projecture or ſtanding out of a figure, which ariſes prominent from the ground or plan on which it is formed; whether that figure be cut with a chiſſel, moulded, or caſt.

There are three kinds or degrees of relievos, viz. alto, baſſo, and demi-relievo. The alto-relievo, called alſo haut-relief, or high-relievo, is when the figure is formed after nature, and projects as much as the life. Baſſo-relievo, baſs-relief, or low relievo, is when the work is raiſed but a little from the ground, as in medals, and the frontiſpieces of buildings; and particularly in the hiſtories, feſtoons, foliages, and other ornaments of friezes. Demi-relievo, is when one half of the figures riſes from the plan. When, in a baſſo-relievo, there are parts that ſtand clear out, detached from the reſt, the work is called a demi-baſſo.

In architecture, the relievo or projecture of the ornaments, ought always to be proportioned to the magnitude of the building it adorns, and to the diſtance at which it is to be viewed.

RELIEVO, or RELIEF, in painting, is the degree of boldneſs with which the figures ſeem, at a due diſtance, to ſtand out from the ground of the painting.

The relievo depends much upon the depth of the ſhadow, and the ſtrength of the light; or on the height of the different colours, bordering on one another; and particularly on the difference of the colour of the figure from that of the ground: thus, when the light is ſo diſpoſed as to make the neareſt parts of the figures advance, and is well diffuſed on the maſſes, yet inſenſibly diminiſhing, and terminating in a large ſpacious ſhadow, brought off inſenſibly, the relievo is ſaid to be bold, and the clair obſcure well underſtood.

RELIGION, that worſhip and homage which is due to God, conſidered as our creator, preſerver, and moſt bountiful benefactor.

RELIGIOUS, in popiſh countries, is particularly uſed for a perſon engaged, by ſolemn vows, to the monaſtic life: or a perſon ſhut up in a monaſtery to lead a life of devotion and auſterity, under ſome rule or inſtitution. See the articles MONK, NUN, &c.

REMAINDER, in law, is an eſtate in lands, tenements, or rents, not to be enjoyed till after a term of years, or another perſon's deceaſe: thus, a perſon grants lands or tenements to one perſon for a term of years, or for life, and the remainder to another perſon for life, or in fee.

REMAINDER, in mathematics, is what is left after taking a leſſer number out of a greater.

REMINISCENCE, *Reminiſcentia*, that power of the human mind, whereby it recollects itſelf, or calls again into its remembrance ſuch ideas or notions as it had really forgot: in which it differs from memory, which is a treaſuring up of things in the mind, and keeping them there without forgeting them. See the article MEMORY.

REMISSION, in phyſics, the abatement of the power or efficacy of any quality, in oppoſition to the increaſe of the ſame, which is called intenſion. In all qualities, capable of intenſion and remiſſion, the intenſion decreaſes reciprocally as the ſquares of diſtances from the center of the radiating quality increaſe.

REMISSION, in medicine, is when a diſtemper abates, but does not go quite off before it returns again, as is common in fevers, which do not quite intermit.

REMISSION, in law, &c. denotes the pardon of a crime, or the giving up the puniſhment due thereto.

REMITTANCE, in commerce, the traffic or return of money from one place to another, by bills of exchange, orders, or the like.

This word is alſo uſed in ſpeaking of the payment of a bill of exchange. It alſo ſignifies the fee or reward given a banker, both of his wages and the different value of the ſpecies in the places where you pay the money and where he remits it.

REMITTER, in law. Where a perſon has two titles to lands, &c. and he comes to ſuch lands by

by the laſt title, which proving defective, he ſhall be reſtored to, and adjudged in, by virtue of his former more antient title, this is called remitter.

REMONSTRANCE, an expoſtulation or humble ſupplication, addreſſed to a king, or other ſuperior, beſeeching him to reflect on the inconveniencies, or ill conſequences of ſome order, edict, or the like.

This word is alſo uſed for an expoſtulary counſel, or advice; or a gentle and handſome reproof, made either in general, or particular, to apprize or correct ſome fault, &c.

REMORA, the SUCK-FISH, in ichthyology, a ſingular fiſh which grows to about nine inches in length, and more than two in diameter in the largeſt part of the body, which is near the head, whence it becomes gradually ſmaller to the tail; the back is convex, the belly flat, and the ſides are rounded by means of the ſtructure of its head. This fiſh applies itſelf firmly to any ſolid body that it pleaſes; and is frequently found ſticking to the bottom of ſhips, and often to large fiſh.

REMOUNT, in war. To remount the cavalry, is to furniſh troopers or dragoons with freſh horſes, inſtead of ſuch as have been killed or diſabled in the ſervice.

RENAL, ſomething belonging to the reins or kidneys. See the article KIDNEY.

RENCOUNTER, in the military art, an engagement of two little bodies or parties of forces; in which ſenſe it ſtands in oppoſition to a pitched battle.

RENCOUNTRE, or RENCONTRE, in heraldry, is applied to animals when they ſhew the head in front, with both eyes, &c. or when the face ſtands right forward, as if they came to meet the perſon before them.

RENDEZVOUS, or RENDEVOUS, a place appointed to meet in, at a certain day and hour.

RENEGATE, or RENEGADO, a perſon who has apoſtatized or renounced the chriſtian faith, to embrace ſome other religion, particularly mahometaniſm.

RENIFORM, ſomething reſembling the figure or ſhape of the kidneys. See the article KIDNEY.

RENITENCY, *Renitentia*, among philoſophers, that force in ſolid bodies, whereby they reſiſt the impulſe of other bodies, or re-act as much as they are acted on. See the article REACTION, &c.

RENT, *Reditus*, in law, a ſum of money, or other conſideration, iſſuing yearly out of lands or tenements.

RENTAL ſignifies a roll in which the rents of manors are ſet down, in order for the lord's baliff, thereby to collect the ſame. It contains the lands let to each tenant, with their names, and the ſeveral rents ariſing.

RENUNCIATION, *Renunciatio*, the act of renouncing, abdicating, or relinquiſhing any right, real or pretended.

REPAIRING, or REPARATION, *Reparatio*, the act of retrieving, mending, or eſtabliſhing a building or other work damaged or gone to decay. In reſpect to reparations, if a tenant or leſſee covenants that from and after the amendment of the tenements by the leſſor he will, at his own charge, keep and leave them in repair, in that caſe the leſſee is not obliged to do the ſame until the leſſor has firſt made good the reparations; and here if a houſe be well repaired at firſt, when the leaſe began, and afterwards decays, it is ſaid the landlord muſt put it in repair before the tenant is bound to keep it ſo.

REPARTEE, or REPARTY, a ready ſmart reply, eſpecially in matters of wit, humour, or raillery.

REPARTITION, a dividing or ſharing a thing a ſecond time.

REPEALING, in law, the revoking or annulling of a ſtatute, or the like. See ABROGATION and REVOCATION.

REPEAT, in muſic, a character ſhewing that what was laſt played or ſung muſt be repeated or gone over again.

REPELLENTS, in medicine, remedies which drive back a morbid humour into the maſs of blood from which it was unduly ſecreted.

REPERCUSSION, in mechanics. See the article REFLECTION.

REPERCUSSION, in muſic, a frequent repetition of the ſame ſound. See the article REPETITION.

REPERTORY, *Repertorium*, a place wherein things are orderly diſpoſed, ſo as to be eaſily found when wanted. The indices of books are repertories, ſhewing where the matters ſought for are treated of. Common-place books are alſo kinds of repertories.

REPETITION, *Repetitio*, the reiterating of an action.

REPETITION, in muſic, denotes a reiterating or playing over again the ſame part of a compoſition, whether it be a whole ſtrain, part of a ſtrain, or double ſtrain, &c. The repetition is denoted by a character called a repeat, which is varied ſo as to expreſs the various circumſtances of a repeat. See REPEAT.

REPETITION, in rhetoric, a figure which gracefully and emphatically repeats either the ſame word, or the ſame ſenſe in different words.

REPLANTING, in gardening, the act of planting a ſecond time. See the article PLANTING.

REPLETION, in medicine, a plenitude or plethora. See PLETHORA.

Repletion is more dangerous than inanition. Bleeding and diet are the great reſources whence a perſon is incommoded with a repletion.

Repletion

Repletion is ſometimes alſo uſed where the ſtomach is overloaden with two much eating or drinking. The phyſicians hold all repletion to be prejudicial, but that of bread is of all others the worſt.

REPLETION, in the canon law, is where the revenue of a benefice or benefices is ſufficient to fill or occupy the whole right or title of the graduate who holds them. Where there is a repletion, the party can demand no more by virtue of his degrees. In England, where benefices are not appropriated to degrees, repletion, ſtrictly ſpeaking, has no place.

REPLEVIN, in law, a remedy granted on a diſtreſs, by which the firſt poſſeſſor has his goods reſtored to him again, on his giving ſecurity, to the ſheriff that he will purſue his action againſt the party diſtraining, and return the goods or cattle, if the taking them ſhall be adjudged lawful.

REPLEVY, in law, is a tenant's bringing a writ of replevin, or replegiari facias, where his goods are taken by diſtreſs for rent; which muſt be done within five days after the diſtreſs, otherwiſe at the five days end, they are to be appraiſed and ſold. 2 W. and M. c. 5.

This word is alſo uſed for bailing a perſon, as in the caſe of a homine replegiando.

REPLICATION, in logic, the aſſuming or uſing the ſame term twice in the ſame propoſition.

REPORT, the relation made upon oath, by officers or perſons appointed to viſit, examine, or eſtimate the ſtate, expences, &c. of any thing.

REPORT, in law, is a public relation of caſes judicially argued, debated, reſolved, or adjudged in any of the king's courts of juſtice, with the cauſes and reaſons of the ſame, as delivered by the judges.

REPOSE, in painting, certain maſſes or large aſſemblages of light and ſhade, which being well conducted, prevent the confuſion of objects and figures, by engaging and fixing the eye ſo as it cannot attend to the other parts of the painting for ſome time; and thus leading it to conſider the ſeveral groups gradually proceeding, as it were from ſtage to ſtage.

REPOSITORY, a ſtone houſe or place in which things are laid up and preſerved.

In this ſenſe we ſay, the repoſitory of the royal ſociety. See MUSEUM.

REPRESENTATION, in the drama, the exhibition of a theatrical piece, together with the ſcenes, machines, &c.

REPRESENTATIVE, one who perſonates or ſupplies the place of another, and is inveſted with his right and authority. Thus the houſe of commons are the repreſentatives of the people in parliament. See PARLIAMENT.

REPRIEVE, or REPRIVE, in law is ſuſpending or deferring the execution of the law upon a priſoner for a certain time: or a warrant from the king for deferring the execution of a perſon condemned.

REPRISALS, a right which princes claim of taking from their enemies any thing equivalent to what they unjuſtly detain from them.

Repriſals is alſo uſed for a letter of marque granted by a prince to his ſubject. See the article MARQUE.

REPRISE, or REPRIZE, at ſea, is a merchant-ſhip which, after its being taken by a corſair, privateer, or other enemy, is retaken by the oppoſite party.

REPRIZES, in law, are deductions or payments annually made out of a manor or lands; as rent-charges, penſions, annuities, &c.

REPROBATION, in theology, a decree by which God is ſuppoſed either from all eternity, or from the creation of the world, to conſign over to eternal miſery the greateſt part of mankind, and to ſave none of the human race, except thoſe whom he made the heirs of glory by election.

Caſuiſts diſtinguiſh two kinds of reprobation, poſitive and negative. Poſitive reprobation, is that by which God is ſuppoſed to create men with a poſitive and abſolute reſolution to damn them eternally: and negative reprobation, is that whereby God, though he creates all men with a ſincere deſire to ſave them, and furniſhes them with all the neceſſary means of ſalvation, ſo that all may be ſaved that will; yet ſees there are ſeveral who will not do it, with the aids he ſhall afford them, and ſees, at the ſame time, they would do it with certain other aids, which he ſees, but will not give them.

REPRODUCTION, the act whereby a thing is produced anew, or grows a ſecond time.

REPTILES, in natural hiſtory, a kind of animals denominated from their creeping or advancing on the belly. Or reptiles are a genus of animals and inſects, which inſtead of feet, reſt on one part of the body while they advance forward with the reſt.

Such are earthworms, ſnakes, caterpillars, &c. Indeed moſt of the claſs of reptiles have feet; only thoſe very ſmall, and the legs remarkably ſhort in proportion to the bulk of the body.

Naturaliſts obſerve a world of artful contrivance for the motion of reptiles. Thus, particularly in the earth-worm, Dr. Willis tells us, the whole body is only a chain of annular muſcles; or, as Mr. Derham ſays, it is only one continued ſpiral muſcle, the orbicular fibres whereof being contracted render each ring narrower and longer than before; by which means it is enabled, like the worm of an augre, to bore its paſſage into the earth. Its reptile motion might alſo be explained by a wire wound on a cylinder, which when ſlipped off, and one end extended and held faſt, will bring the other near to it. So the earth-worm having ſhot out or extended his body (which is with a wreathing) it takes hold

by theſe ſmall feet it hath, and ſo contracts the hinder part of its body. Dr. Tyſon adds, that when the fore-part of the body is ſtretched out, and applied to a plane at a diſtance, the hind part relaxing and ſhortening is eaſily drawn towards it as a center.

Its feet are diſpoſed in a quadruple row the whole length of the worm, with which, as with ſo many hooks, it faſtens down ſometimes this and ſometimes that part of the body to the plane, and at the ſame time ſtretches out or drags after it another.

The creeping of ſerpents is effected after a ſomewhat different manner; there being a difference in their ſtructure, in that theſe laſt have a compages of bones articulated together.

The body here is not drawn together, but as it were complicated; part of it being applied on the rough ground, and the reſt ejaculated and ſhot from it, which, being ſet on the ground in its turn, brings the other after it. The ſpine of the back variouſly wreathed has the ſame effect in leaping, as the joints in the feet of other animals; they make their leaps by means of muſcles, and extend the plicæ or folds.

REPTILE, is alſo uſed, by ſome botanical writers, to ſignify plants which creep upon the earth, unleſs ſuſtained by ſome other plant, prop, &c. As the vine, cucumbers, melons, &c.

REPUBLIC, *Reſpublica*, commonwealth, a popular ſtate or government; or a nation where the people have the government in their own hands.

REPUBLIC *of Letters*, a phraſe uſed collectively of the whole body of the people of ſtudy and learning.

REPUDIATION, *Repudium*, in the civil law, the act of divorcing. See DIVORCE.

REPULSION, *Repulſio*, in phyſics, that property in bodies whereby, if they are placed juſt beyond the ſphere of each other's attraction of cohesion, they mutually fly from each other.

Thus if an oily ſubſtance, lighter than water, be placed on the ſurface thereof, or if a piece of iron be laid upon mercury, the ſurface of the fluid will be depreſſed about the body laid on it: this depreſſion is manifeſtly occaſioned by a repelling power in the bodies, which hinders the approach of the fluid towards them. But it is poſſible, in ſome caſes, to preſs or force the repelling bodies into the ſphere of one another's attraction; and then they will mutually tend towards each other, as when we mix oil and water till they incorporate.

Dr. Knight defines repulſion to be that cauſe which makes bodies mutually endeavour to recede from each other, with different forces, at different times; and, that ſuch a cauſe exiſts in nature, he thinks evident for the following reaſons: 1. Becauſe all bodies are electrical, or capable of being made ſo; and it is well known, that electrical bodies both attract and repel. 2. Both attraction and repulſion are very conſpicuous in all magnetical bodies. 3. Sir Iſaac Newton has ſhewn from experiments, that the ſurfaces of two convex glaſſes repel each other. 4. The ſame great philoſopher has explained the elaſticity of the air, by ſuppoſing its particles mutually to repel each other. 5. The particles of light are, in part at leaſt, repelled from the ſurfaces of all bodies. 6. Laſtly, it ſeems highly probable, that the particles of light mutually repel each other, as well as the particles of air.

The ſame gentleman aſcribes the cauſe of repulſion, as well as that of attraction, to the immediate effect of God's will; and as attraction and repulſion are contraries, and conſequently cannot, at the ſame time, belong to the ſame ſubſtance, the doctor ſuppoſes there are in nature two kinds of matter, one attracting, the other repelling; and that thoſe particles of matter which repel each other, are ſubject to the general law of attraction in reſpect of other matter.

A repellent matter being thus ſuppoſed, equally diſperſed through the whole univerſe, the doctor attempts to account for many natural phænomena by means thereof. He thinks light is nothing but this repellent matter, put into violent vibrations by the repellent corpuſcles which compoſe the atmoſphere of the ſun and ſtars; and that, therefore, we have no reaſon to believe they are gulphs of fire, but, like the reſt of the heavenly bodies, inhabitable worlds.

From the ſame principles, he attempts to explain the nature of fire and heat, the various phænomena of the magnet, and the cauſe of the variation of the needle: and, indeed, it is difficult, if not impoſſible, by the doctrine of attraction alone, to account for all the phænomena obſervable in experiments made with magnets, which may now be ſolved by admitting this doctrine of a repellent fluid; but whether it will be ſufficient to account for all the particular phænomena of nature, which are the proper teſts of an hypotheſis, time and experience alone muſt determine.

The doctor alſo endeavours to ſhew, that the attractions of coheſion, gravity, and magnetiſm, are the ſame, and that by theſe two active principles, viz. attraction and repulſion, all the phænomena of nature may be explained; but as his ingenious treatiſe on this ſubject is laid down in a ſeries of propoſitions, all connected together, it would be impoſſible to do juſtice to his arguments, without tranſcribing the whole; we ſhall therefore refer the curious to the book itſelf.

According to 's Graveſande and others, when light is reflected from a poliſhed ſpherical ſurface, the particles of light do not ſtrike upon the ſolid parts, and ſo rebound from them; but are repelled

from the ſurface, at a ſmall diſtance before they touch it, by a power extended all over the ſaid poliſhed ſurface: and Sir Iſaac Newton obſerves, that the rays of light are alſo expelled by the edges of bodies, as they paſs near them; ſo as to make their ſhadows, in ſome caſes, larger than they would otherwiſe be.

REQUEST, in law, a ſupplication or petition preferred to a prince, or to a court of juſtice, begging relief in ſome conſcionable caſes, where the common law grants no immediate redreſs.

Court of REQUESTS, an ancient court of equity, inſtituted about the nineteenth year of Henry VII.

REQUIEM, in the Romiſh church, a maſs ſung for the reſt of the ſoul of a perſon deceaſed.

RESCEIT, *Receptio*, in law, an admiſſion or receiving of a third perſon to plead his right, in a cauſe formerly commenced between the other two.

RESCRIPT, *Reſcriptum*, an anſwer delivered by an emperor, or a pope, when conſulted by particular perſons, on ſome difficult queſtion, or point of law, to ſerve as a deciſion thereof.

RESEARCH, a ſcrutiny, or diligent enquiry into any thing.

RESEARCHING, in ſculpture, the repairing of a caſt figure, &c. with proper tools; or the finiſhing it with art and exactneſs, ſo as the minuteſt parts may be well defined.

RESEDA, in botany, a genus of plants, whoſe flower-corolla conſiſts of a few unequal petals, ſome of which are always ſemitrifid, with a plane, erect, nectarious glandule, produced from the receptacle: the ſtamina are fifteen or ſixteen ſhort filaments, topped with obtuſe antheræ: the fruit is a gibbous and angulated capſule, containing one cell, which is filled with numerous kidney-ſhaped ſeeds.

RESERVATION, in law, an action or clauſe whereby ſomething is reſenced, or ſecured to one's ſelf.

Mental RESERVATION, a propoſition, which, ſtrictly taken, and according to the natural import of the terms, is falſe; but, if qualified by ſomething concealed in the mind, becomes true.

Body of RESERVE, or *Corps de* RESERVE, in military affairs, the third or laſt line of an army, drawn up for battle; ſo called, becauſe they are reſerved to ſuſtain the reſt, as occaſion requires; and not to engage but in caſe of neceſſity.

RESERVOIR, a place where water is collected and reſerved, in order to be conveyed to diſtant places through pipes, or ſupply a fountain, or jet d'eau.

RESET, in law, the receiving or harbouring an outlawed perſon. See OUTLAWRY.

RESIDENCE, in the canon and common law, the abode of a perſon, or incumbent, upon his benefice; and his aſſiduity in attending on the ſame.

RESIDENT, a public miniſter, who manages the affairs of a kingdom or ſtate, at a foreign court. They are a claſs of public miniſters, inferior to ambaſſadors or envoys; but, like them, are under the protection of the law of nations.

RESIDENTIARY, *Reſidentiarius*, a canon inſtalled into the privileges and profits of reſidence.

RESIDUAL FIGURE, in geometry, the figure remaining after ſubtracting a leſſer from a greater.

RESIDUAL ROOT, in algebra, a root compoſed of two parts or members, connected together by this ſign, —.

Thus $x-y$ is a reſidual root, ſo called, becauſe its value is no more than the difference between its parts x and y.

RESIDUE, *Reſiduum*, the remainder or balance of an account, debt, or obligation.

RESIGNATION, in the canon law, the ſurrendering a benefice into the hands of the collator, or biſhop.

RESIGNEE, in law, the perſon to whom a thing is reſigned.

RESIN, in natural hiſtory, a viſcid juice, oozing either ſpontaneouſly, or by inciſion, from ſeveral trees, as the pine, fir, &c.

The reſins of vegetables may be prepared nearly in the ſame manner as extracts, by uſing rectified ſpirit of wine inſtead of water: for ſuch a ſpirit is the only proper menſtruum that will diſſolve the groſſer reſinous matter of vegetables, as water is of the mucilaginous and ſaline parts; yet theſe principles are ſo intimately combined in almoſt all plants, that whichever of theſe liquors is applied at firſt, it will take up a portion of what is directly ſoluble only in the other. Hence, ſundry vegetables, extremely reſinous, and whoſe virtues conſiſt chiefly in their reſin, afford, nevertheleſs, very uſeful extracts with water, though not equal to thoſe obtained by a prudent application of ſpirit. See the article EXTRACT.

RESISTANCE, or RESISTING FORCE, in philoſophy, denotes, in general, any power which acts in an oppoſite direction to another, ſo as to deſtroy or diminiſh its effect.

Hence the force wherewith bodies, moving in fluid mediums, are impeded or retarded, is the reſiſtance of thoſe fluids. See FLUID.

Authors have eſtabliſhed it as a certain rule, that, whilſt the ſame body moves in the ſame medium, it is always reſiſted in the duplicate proportion of its velocity; that is, if the reſiſted body move in one part of its track, with three times the velocity with which it moved in ſome other part, then its reſiſtance to the greater velocity will be nine times the reſiſtance to the leſſer: if the velocity in one place be four times the velocity in another, the reſiſtance to the greater velocity will be ſixteen times the reſiſtance to the leſſer, and ſo on. This rule, though exceſſively erroneous, when taken in a general ſenſe, is yet undoubtedly very near the truth, when confined within certain limits.

In order to conceive the reſiſtance of fluids to a body moving in them, Mr. Robins diſtinguiſhes between thoſe fluids, which being compreſſed by ſome incumbent weight, perpetually cloſe up the ſpace deſerted by the body in motion, without permitting, for an inſtant, any vacuity to remain behind it; and thoſe fluids in which, they being not ſufficiently compreſſed, the ſpace left behind the moving body remains for ſome time empty. Theſe differences, in the reſiſting fluids, will occaſion very remarkable varieties in the laws of their reſiſtance, and are abſolutely neceſſary to be conſidered in the determination of the action of the air in ſhot and ſhells; for the air partakes of both theſe affections, according to the different velocities of the projected body.

If a fluid was ſo conſtituted that all the particles compoſing it were at ſome diſtance from each other, and there was no action between them, then the reſiſtance of a body moving therein, would be eaſily computed from the quantity of motion communicated to theſe particles: for inſtance, if a cylinder moved in ſuch a fluid in the direction of its axis, it would communicate to the particles it met with a velocity equal to its own, and in its own direction, ſuppoſing that neither the cylinder, nor the parts of the fluid, were elaſtic; whence, if the velocity and diameter of the cylinder be known, and alſo the denſity of the fluid, there would thence be determined the quantity of motion communicated to the fluid, which (action and re-action being equal) is the ſame with the quantity loſt by the cylinder, conſequently the reſiſtance would be hereby aſcertained.

In this kind of diſcontinued fluid, the particles being detached from each other, every one of them can purſue its own motion in any direction, at leaſt for ſome time, independent of the neighbouring ones; wherefore, if inſtead of a cylinder moving in the direction of its axis, a body, with a ſurface oblique to its direction, be ſuppoſed to move in ſuch a fluid, the motion the parts of the fluid will hereby acquire, will not be in the direction of the reſiſted body, but perpendicular to its oblique ſurface; whence, the reſiſtance to ſuch a body will not be eſtimated from the whole motion communicated to the particles of the fluid, but from that part of it only, which is in the direction of the reſiſted body. In fluids then, where the parts are thus diſcontinued in each other, the different obliquities of that ſurface, which goes foremoſt, will occaſion conſiderable changes in the reſiſtance; although the ſection of the ſolid, by a plane perpendicular to its direction, ſhould in all caſes be the ſame. And Sir Iſaac Newton has particularly determined, that in a fluid thus conſtituted, the reſiſtance of a globe is but half the reſiſtance of a cylinder of the ſame diameter, moving in the direction of its axis with the ſame velocity.

But though the hypotheſis of a fluid, thus conſtituted, be of great uſe in explaining the nature of reſiſtances; yet, in reality, no ſuch fluid does exiſt within our knowledge: all the fluids with which we are converſant, are ſo formed, that their particles either lie contiguous to each other, or at leaſt act on each other as if they did; conſequently, in theſe fluids, no one particle, contiguous to the reſiſted body, can be moved, without moving at the ſame time a great number of others, ſome of which will be diſtant from it; and the motion thus communicated to a maſs of the fluid will not be in any one determined direction, but will in each particle be different, according to the different manners in which it lies in contact with thoſe, from which it receives its impulſe; whence great numbers of the particles, being diverted into oblique directions, the reſiſtance of the moving body, which will depend on the quantity of motion communicated to the fluid in its own direction, will be hereby different in quantity, from what it would be in the preceding ſuppoſition, and its eſtimation becomes much more complicated and operoſe.

Sir Iſaac Newton, however, has determined, that the reſiſtance to a cylinder, moving in the direction of its axis in ſuch a compreſſed fluid as we have here treated of, is but one fourth part of the reſiſtance, which the ſame cylinder would undergo, if it moved with the ſame velocity, in a fluid, conſtituted in the manner we have deſcribed in our firſt hypotheſis, each fluid being ſuppoſed to be of the ſame denſity.

But, again, it is not only in the quantity of their reſiſtance that theſe fluids differ, but likewiſe in the different manner in which they act on ſolids of different forms moving in them.

We have ſhewn, that in the diſcontinued fluid, which we firſt deſcribed, the obliquity of the foremoſt ſurface of the moving body would diminiſh the reſiſtance; but in compreſſed fluids this holds not true, at leaſt not in any conſiderable degree; for the principal reſiſtance in compreſſed fluids ariſes from the greater or leſſer facility, with which the fluid, impelled by the forepart of the body, can circulate towards its hinder part; and this being little, if at all, affected by the form of the moving body, whether it be cylindrical, conical, or ſpherical, it follows, that while the tranſverſe ſection of the body, and conſequently the quantity of impelled fluid is the ſame, the change of figure in the body will ſcarcely affect the quantity of its reſiſtance.

The reſiſtance of bodies of different figures, moving in one and the ſame medium, has been conſidered by Mr. J. Bernouli in the Acta Lipſienſ. for May, 1693; and the rules he lays down, on this ſubject, are the following: 1. If an iſoſceles triangle be moved in the fluid according to the direction of a line which is normal to its baſe; firſt with the vertex foremoſt, and then with its baſe; the reſiſtances

ances will be as the legs, and as the ſquare of the baſe, and as the ſum of the legs. 2. The reſiſtance of a ſquare moved according to the direction of its ſide, and of its diagonal, is as the diagonal to the ſide. 3. The reſiſtance of a circular ſegment (leſs than a ſemi-circle) carried in a direction perpendicular to its baſis, when it goes with the baſe foremoſt, and when with its vertex foremoſt (the ſame direction and celerity continuing, which is all along ſuppoſed) is as the ſquare of the diameter to the ſame, leſs one third of the ſquare of the baſe of the ſegment.

Cor. Hence the reſiſtances of a ſemi-circle, when its baſe, and when its vertex go foremoſt, are to one another in a ſeſquialterate ratio. 4. A parabola moving in the direction of its axis, with its baſis, and then its vertex foremoſt, has its reſiſtances, as the tangent to an arch of a circle, whoſe diameter is equal to the parameter, and the tangent equal to half the baſis of the parabola. 5. The reſiſtances of an hyperbola, or the ſemi-ellipſis, when the baſe and when the vertex go foremoſt, may be thus computed; let it be, as the ſum, or difference, of the tranſverſe axis, and latus rectum, is to the tranſverſe axis, ſo is the ſquare of the latus rectum to the ſquare of the diameter of a certain circle; in which circle apply a tangent equal to half the baſis of the hyperbola or ellipſis. Then ſay again, as the ſum, or difference, of the axis and parameter is to the parameter, ſo is the aforeſaid tangent to another right line. And further, as the ſum, or difference, of the axis and parameter is to the axis, ſo is the circular arch, correſponding to the aforeſaid tangent, to another arch. This done, the reſiſtances will be as the tangent to the ſum, or difference, of the right line thus found, and that arch laſt mentioned. 6. In general, the reſiſtances of any figure whatſoever going now with its baſe foremoſt, and then with its vertex, are as the figures of the baſis to the ſum of all the cubes of the element of the baſis divided by the ſquares of the elements of the curve line.

All which rules, he thinks, may be of uſe, in the fabric or conſtruction of ſhips, and in perfecting the art of navigation univerſally. As alſo for determining the figures of the balls of pendulums for clocks. See the article SHIP, &c.

As to the reſiſtance of the air, Mr. Robins, in his new principles of gunnery, took the following method to determine it: he charged a muſket-barrel three times ſucceſſively with a leaden ball $\frac{3}{4}$ of an inch diameter, and took ſuch precaution in the weighing of the powder, and placing it, as to be ſure, by many previous trials, that the velocity of the ball could not differ by 20 feet in 1″ from its medium quantity. He then fired it againſt a pendulum, placed at 25, 75, and 125 feet diſtance, &c. from the mouth of the piece reſpectively. In the firſt caſe it impunged againſt the pendulum with a velocity of 1670 feet in 1″; in the ſecond caſe with a velocity of 1550 feet in 1″; and in the third caſe with a velocity of 1425 feet in 1″; ſo that in paſſing through 50 feet of air, the bullet loſt a velocity of about 120, or 125 feet in 1″; and the time of its paſſing through that ſpace being about $\frac{1}{312}$ or $\frac{1}{320}$ of 1″, the medium quantity of reſiſtance muſt, in theſe inſtances, have been about 120 times the weight of the ball; which, as the ball was nearly $\frac{1}{12}$ of a pound, amounts to about 10 lb. avoirdupoiſe.

Now if a computation be made, according to the method laid down for compreſſed fluids in the 38th propoſition of lib. 2. of Sir Iſaac Newton's Principia, ſuppoſing the weight of water to be to that of air, as 850 to 1, it will be found that the reſiſtance of a globe of three quarters of an inch diameter, moving with a velocity of about 1600 feet in 1″, will not, on thoſe principles, amount to any more than a force of $4\frac{1}{6}$ lb. avoirdupoiſe; whence we may conclude (as the rules in that propoſition for ſlow motions are very accurate) that the reſiſting power of the air in ſlow motions is leſs than in ſwift motions, in the ratio of $4\frac{1}{6}$ to 10, a proportion between that of 1 to 2, and 1 to 3.

Again, charging the ſame piece with equal quantities of powder, and balls of the ſame weight, and firing three times at the pendulum, placed at 25 feet diſtance from the mouth of the piece, the medium of the velocities with which the ball impinged was 1690 feet in 1″. Then removing the piece 175 feet from the pendulum, the velocity of the ball, at a medium of five ſhots, was 1300 feet in 1″. Whence the ball, in paſſing through 150 feet of air, loſt a velocity of about 390 feet in 1″; and the reſiſtance computed from theſe numbers, comes out ſomething more than in the preceding inſtance, amounting to between 11 and 12 pounds avoirdupoiſe: whence, according to theſe experiments, the reſiſting power of the air to ſwift motions is greater than in ſlow ones, in a ratio which approaches nearer to the ratio of 3 to 1, than in the preceding experiments.

Having thus aſcertained the reſiſtance to a velocity of near 1700 feet in 1″, he next proceeded to examine this reſiſtance in ſmaller velocities: the pendulum being placed at 25 feet diſtance, was fired at five times, and the mean velocity with which the ball impinged was 1180 feet in 1″. Then removing the pendulum to the diſtance of 250 feet, the medium velocity of five ſhot at this diſtance, was 950 feet in 1″; whence the ball, in paſſing through 225 feet of air, loſt a velocity of 230 feet in 1″, and as it paſſed through that interval in about $\frac{3}{14}$ of 1″, the reſiſtance to the middle velocity will come out to be near $33\frac{1}{2}$ times the gravity of the ball, or 2 lb. 10 oz. avoirdupoiſe. Now the reſiſtance to the ſame velocity, according to the laws obſerved in ſlower motions, amounts to $\frac{7}{11}$ of the ſame

ſame quantity; whence in a velocity of 1065 feet in 1″, (the medium of 1180 and 950) the reſiſting power of the air is augmented in no greater proportion than of 11 to 7; whereas in greater degrees of velocity, as before, it amounted very near to the ratio of 3 to 1.

That this reſiſting power of the air to ſwift motions, is very ſenſibly increaſed beyond what Sir Iſaac's theory for ſlow motions makes it, ſeems hence to be evident. It being, as has been ſaid, in muſket, or cannon ſhot, with their full charge of powder, near three times the quantity aſſigned by that theory.

The reſiſtance of a bullet of three quarters of an inch diameter, moving in air with a velocity of 1670 feet in 1″, amounting, as we ſaid, to 10lb. the reſiſtance of a cannon ball of 24 lb. fired with its full charge of powder, and thereby moving with a velocity of 1650 feet in 1″, may hence be determined. For the velocity of the cannon ball being near the ſame as the muſket bullet, and its ſurface above 54 times greater, it follows, that the reſiſtance on the cannon ball will amount to more than 540lb. which is near 23 times its own weight. And from hence it appears how raſh and erroneous the opinion of thoſe is, who neglect the conſideration of the reſiſtance of the air as of no importance in the doctrine of projectiles. See the articles PROJECTILE and GUNNERY.

RESISTANCE of the fibres of ſolid bodies is more properly called coheſion. See the article COHESION.

RESOLUTION, in chemiſtry, &c. the reduction of a mixed body into its component parts, or firſt principles, by a proper analyſis.

RESOLUTION, in medicine, that coction or alteration of the crude peccant matter of any diſeaſe, either by the natural ſtrength of the patient, or of its own accord, or by the application of remedies, whereby its bulk, figure, coheſion, &c. are ſo far changed, as that it ceaſes to be morbid, and becomes laudable.

RESOLVENTS, *Reſolventia*, in medicine, remedies proper to reſolve and diſſipate tumours and gatherings, to ſoften indurations, and, by their tenuity and warmth, evacuate redundant or peccant humours through the pores. Under this claſs come various unguents, emplaſters, &c.

RESONANCE, reſounding, in muſic, &c. a ſound returned by the air, incloſed in the bodies of ſtringed muſical inſtruments, as lutes, &c. or even in the bodies of wind inſtruments, as flutes, &c. See SOUND and MUSIC.

RRSPIRATION, *Reſpiratio*, the act of reſpiring, or breathing the air. What reſpiration is, and why it is uninterruptedly carried on without the concurrence of the mind, will appear from the following conſiderations of Boerhaave. The lungs ſuſpended in the air, which every where acts upon them, and equally preſſes them always, collapſe, contract themſelves into a ſmaller ſpace, and become much leſs than when they remained in the intire thorax. This is principally performed by the contractile force of the muſcular fibres, which connect the ſquamous ſegments of the bronchia. If the lungs thus contracted, are filled with air, forcibly blown through the glottis, they are ſo diſtended as in bulk not only to equal that which they had in the intire thorax, but even to exceed it; all which is ſufficiently certain from experiments. The ſame thing happens if, when an acceſs for the air through the glottis is left to the lungs, the air externally acting on the lungs, is either removed, or its preſſure diminiſhed. Hence it is obvious, that the lungs, by their proper force, have always a tendency to become leſs in all their parts than they are when placed in the intire thorax. For this reaſon, it is certain that they are in a continual ſtate of diſtraction ſo long as a perſon is alive, ſo that they muſt collapſe, and be diminiſhed, whilſt the whole of the animal remains in a vacuum, obtained by an exhauſtion of the air in an air-pump. For there is nothing ſimilar to a curcumambient air between the external membrane of the lungs, and all the internal ſurface of the pleura in a ſound perſon; nothing therefore externally compreſſes the lungs, except the diaphragm. There is, however, always an internal air contained in them, and freely conveyed to them through the glottis. Hence the lungs are always ſomewhat more diſtended by the internal, than they are compreſſed by the external, air, the acceſs of which is hindered by the diaphragm, which is ſo connected with the ribs and vertebræ, that the air cannot enter the thorax in ſuch a manner as would be requiſite for an equilibrium.

RESPITE, in law, &c. ſignifies a delay, forbearance, or prolongation of time, granted any one, for the payment of a debt, or the like.

RESPONDENT SUPERIOR, in law, is a ſuperior's anſwering for the inſufficiency of an inferior. Thus, if the ſheriffs of London are inſufficient, the lord-mayor and commonalty muſt anſwer for them, as the ſheriffs ſuperior.

RESPONDENT, in the ſchools, one who maintains a theſis, in any art or ſcience; who is thus called, from his being to anſwer all the objections propoſed by the opponent.

RESPONDENT, in law, a perſon who undertakes to anſwer for another; and alſo, one who binds himſelf as a ſecurity for another perſon's good behaviour.

RESSAULT, in architecture, is the effect of a body which either projects or ſinks back; that is, ſtands more out or in, than another, ſo as to be out of the line or level with it.

REST, *Quies*, the continuance of a body in the ſame place, or its continual application or contiguity to the ſame parts of the ambient or conti-

guous bodies; and, therefore is oppoſed to motion. See the article MOTION.

Sir Iſaac Newton defines true or abſolute reſt, to be the continuance of a body in the ſame part of abſolute ſpace; and relative reſt to be the continuance of a body in the ſame part of relative ſpace. See the article SPACE.

It is one of the laws of nature, that matter is indifferent to motion or reſt, as has been ſhewn under the article INERTIA.

Reſt conſidered in a phyſical view, is only ſalutary, in ſo far as it is duly proportioned to the exerciſe; for a ſedentary idle life brings on many indiſpoſitions. See the article EXCISE.

REST, in poetry, is a ſhort pauſe of the voice, in reading, being the ſame with the cæſura, which, in Alexandrine verſes, falls on the ſixth ſyllable; but in verſes of ten or eleven ſyllables, on the fourth.

REST, in muſic, the ſame with pauſe. See the article PAUSE.

RESTIVE, or RESTY, in the manege, a ſtubborn, unruly, ill-broken horſe, that ſtops, or runs back, inſtead of advancing forward.

RESTORATIVE, in medicine, a remedy proper for reſtoring and retrieving the ſtrength and vigour both of the body and animal ſpirits.

RESTRICTION, among logicians, is limiting a term, ſo as to make it ſignify leſs than it uſually does.

RESULT, what is gathered from a conference, inquiry, meditation, or the like; or the concluſion and effect thereof.

RESURRECTION, in theology, riſing again from the dead; or a perſon's returning to a ſecond life, with new bodily organs, adapted to the ſtate of its new exiſtence.

One of the greateſt arguments for the truth of chriſtianity is drawn from the reſurrection of our Saviour; the circumſtances of which are handed down to us in ſo plain and diſtinct a manner, by the evangeliſts, as make the evidence of this important truth amount to a demonſtration.

Chriſtians generally believe, that at the day of judgment, the very identical body they have now, with the ſame fleſh, blood, and bones, will be raiſed from the dead. But, in oppoſition to this opinion, many texts of ſcripture have been urged, particularly the account given of this important event by St. Paul; beſides ſeveral philoſophical objections, the principal of which are theſe.

That the ſame ſubſtance may happen to be a part of two or more bodies: thus a fiſh feeding on a man, and another man afterwards feeding on the fiſh, part of the body of the firſt man becomes incorporated with the fiſh, and afterwards with the body of the laſt man. Again, inſtances have been known of one man's immediately feeding on the body of another; and among the Cannibals in the Weſt-Indies, who devour their enemies, the practice is frequent. Now it is alledged, where the ſubſtance of one is thus converted into the ſubſtance of another, each cannot ariſe with his whole body; to which then ſhall the common part be allotted?

To this objection ſome anſwer, that as all matter is not capable of being aſſimilated to the body, and incorporated with it, human fleſh may very probably be of this kind; and, therefore, what is thus eaten, may be again excreted and carried off.

But Mr. Leibnitz obſerves, that all that is eſſential to the body, is the original ſtamen, which exiſted in the ſemen of the father: this may be conceived as the moſt minute point imaginable, and therefore not to be ſeparated, nor any part of it united to the ſtamen of any other man. That all this bulk we ſee in the body, is only an accretion to this original ſtamen; and therefore there is no reciprocation of the proper matter of the human body.

Another objection is, that we know, by the late diſcoveries in the animal œconomy, that the human body is continually changing, and that a man has not entirely the ſame body to-day, as he had yeſterday; and it is even computed that in leſs than ſeven years time, the whole body undergoes a change. Which of thoſe many bodies then, which the ſame perſon has in the courſe of his life, is it that ſhall riſe? or does all the matter that has ever belonged to him, riſe again? or does only ſome particular ſyſtem thereof? the body, for example, he had at twenty, at forty, or at ſixty years old? If only this or that body ariſe, how ſhall it be rewarded or puniſhed for what was done by the other? and with what juſtice does one perſon ſuffer for another?

To this it has been anſwered on the principles of Leibnitz, that notwithſtanding theſe ſucceſſive changes, this ſtamen, which is the only eſſential part of the body, has always remained the ſame; and that on Mr. Locke's principles, perſonal identity, or the ſameneſs of a rational being, conſiſts in ſelf-conſciouſneſs, in the power of conſidering itſelf the ſame thing in different times and places. By this, every one is to himſelf what he calls ſelf; without conſidering whether that ſelf be continued in the ſame or in ſeveral ſubſtances. It is the ſame ſelf now, it was then; and it was by the ſame ſelf which now reflects on an action, that action was performed. Now it is this perſonal identity that is the object of rewards and puniſhments, which, it is obſerved may exiſt in different ſucceſſions of matter; ſo that to render the rewards and puniſhments juſt and pertinent, we need only to riſe again with ſuch a body as that we retain the conſciouſneſs of our paſt actions.

RETAIL, in commerce, is the ſelling of goods in ſmall parcels, in oppoſition to wholeſale. See the article COMMERCE.

RETAINER,

RETAINER, in law, a ſervant who does not continually dwell in the houſe of his maſter, but only attends upon ſpecial occaſions.

RETAINING Fee, the firſt fee given to a ſerjeant or counſellor at law, in order to make him ſure, and prevent his pleading on the contrary ſide.

RETARDATION, in phyſics, the act of diminiſhing the velocity of a moving body. See the article Motion.

If bodies of equal bulk, but of different denſities, be moved through the ſame reſiſting medium, with equal velocity, the medium will act equally on each, ſo that they will have equal reſiſtances, but their motions will be unequally retarded, in proportion to their denſities. See the articles Resistance.

Retarded motion from gravity is peculiar to bodies projected upwards, and this in the ſame manner as a falling body is accelerated; only in the latter, the force of gravity acts in the ſame direction with the motion of the body; and in the former in an oppoſite direction. See the article Acceleration.

As it is the ſame force which augments the motion in the falling, and diminiſhes it in the riſing body, a body will riſe till it has loſt all its motion; which it does in the ſame time wherein a body falling would have acquired a velocity equal to that where with the body was projected upwards.

RETE Mirabile, in anatomy, a ſmall plexus, or net-work of veſſels in the brain, ſurrounding the pituitary gland.

The rete mirabile is very conſpicuous in brutes, but either not exiſtent in man, or ſo very minute that its exiſtence is fairly doubted. See the article Brain.

RETENTION, is defined by Mr. Locke, to be a faculty of the mind, whereby it keeps or retains thoſe ſimple ideas it has once received, by ſenſation or reflection.

Retention is alſo uſed, in medicine, &c. for the ſtate of contraction in the ſolids or vaſcular parts of the body, which makes them hold faſt their proper contents.

RETICULAR Body, *Corpus Reticulare*, in anatomy, a very fine membrane, perforated, in the manner of a net, with a multitude of foramina. It is placed immediately under the cuticle, and when that is ſeparated from the cutis, whether by art or by accident, this adheres firmly to it, and is ſcarce poſſible to be parted from it, ſeeming rather to be its inner ſuperficies than a diſtinct ſubſtance. In regard to this, we are to obſerve, firſt, the places in which it is found, being all thoſe in which the ſenſe of feeling is moſt acute, as in the palms of the hands, the extremities of the fingers, and on the ſoles of the feet. The tongue, however, is the part where it is moſt accurately to be obſerved: it is more eaſily diſtinguiſhable there than any where elſe, and its nature and ſtructure are moſt evidently ſeen there.

Its colour in the Europeans is white, but in the Negroes, and other black nations, it is black; in the tawney it is yelloviſh: the ſkin itſelf in both is white; and the blackneſs and yellowneſs depend altogether on the colour of this membrane.

The uſes of the corpus reticulare are to preſerve the ſtructure of the other parts of the integuments, and keep them in their determinate form and ſituation. Its apurtures give paſſage to the hairs, and let through the papillæ and excretory ducts of the ſkin: it retains theſe in a certain and determinate order, that they cannot be removed out of their places, and has ſome ſhare in preſerving the ſoftneſs of the papillæ, which renders them fit for the ſenſe of feeling.

RETICULAR Plexus, *Plexus Reticularis*, ſometimes denotes the choroides, which is thus called becauſe its fibres are interwoven like a net. See Choroides.

RETICULUM, the caul or omentum, a name ſometimes given to this part, from its net-like ſtructure. See the article Omentum.

RETINA, in anatomy, the expanſion of the optic nerve on the internal ſurface of the eye, whereupon the images of objects being painted, are impreſſed, and by that means conveyed to the common ſenſory in the brain, where the mind views and contemplates their ideas.

RETIRADE, in fortification, a kind of retrenchment made in the body of a baſtion, or other work, which is to be diſputed inch by inch, after the defences are diſmantled. It uſually conſiſts of two faces, which make a re-entering angle. When a breach is made in a baſtion, the enemy may alſo make a retirade or new fortification behind it.

RETRACTION, *Retractio*, the act of drawing back, or unſaying what a perſon had ſaid before.

Among anatomiſts, retraction frequently ſignifies the contraction or ſhortening of any part.

RETRACTS, among horſemen, pricks in a horſe's feet, ariſing from the fault of the farrier in driving nails that are weak, or in driving them ill pointed, or otherwiſe amiſs.

RETRAHENS *Auriculam*, in anatomy, a muſcle of the external ear, conſiſting of a parcel of fleſhy fibres, which in ſome bodies are divided into three diſtinct muſcles ariſing from the os temporale, and fixed to the hind part of the concha. But theſe muſcles are ſo ſmall in men, that the auricle is ſeldom moveable at all.

RETREAT, in war, the retiring or moving back again of any army or part thereof.

Retreat, or Relay, in maſonry, a little receſs or diminution of the thickneſs of a wall, rampart, &c. in proportion as it is raiſed. The retreat, properly, is the diminution of a wall without-outſide,

outside, or the contraction of its upper courses more than the foundation. Where the foundation is very long, they usually make two or three retreats.

RETRENCHMENT, literally signifies something cut off or taken from a thing; in which sense it is the same with subtraction, diminution, &c.

RETRENCHMENT, in the art of war, any kind of work raised to cover a post, and fortify it against the enemy, such as fascines loaded with earth, gabions, barrels of earths, sand-bags, and generally all things that can cover the men and stop the enemy. But retrenchment is more particularly applicable to a fos bordered with a parapet; and a post fortified thus is called post retrenched, or strong post.

Retrenchments are either general or particular: general retrenchments are new fortifications made in a place besieged, to cover the besiegers when the enemy become masters of a lodgment on the fortification, that they may be in a condition of disputing the ground inch by inch, and of putting a stop to the enemy's progress in expectation of relief.

Particular retrenchments are such as are made in the bastions when the enemy are masters of the breach. These can never be made but in new full bastions, for in empty, or hollow ones, there can only be made retirades. The particular retrenchments are made several ways, according to the time they have to cover themselves: sometimes they are made before hand, which are certainly the best. The parapets of such retrenchments ought to be five or six feet thick, and five feet high, with a large and deep fos, from whence ought to run out small fougades and countermines.

RETROGRADATION, or RETROGRESSION, the act or effect of a thing moving backwards.

The retrograde motion of the planets is an apparent motion, whereby they seem, to an observer placed on the earth, to move backwards, or contrary to the signs. See PLANET, ORBIT, &c.

RETROGRESSION *of Curves*, their bending or turning backwards. See the articles FLEXURE and INFLECTION.

RETROMINGENTS, in natural history, a class or division of animals, whose characteristic it is that they stale, or make water backwards, both male and female.

REVEILLE, a beat of drum about break of day, to give notice that it is time for the soldiers to arise, and that the centries are to forbear challenging.

REVELATION, the act of revealing, or making a thing public that was before unknown: it is also used for the discoveries made by God to his prophets, and by them to the world; and more particularly for the books of the Old and New Testament.

The principal tests of the truth of any revelation are, its being worthy of God, and consistent with his known attributes; its being agreeable to the clear dictates of unprejudiced reason; and its having a tendency to refine, purify, and exalt the mind of man to an imitation of the Deity in his moral perfections.

Mr. Locke, in laying down the distinct provinces of reason and faith, observes, 1. That the same truths may be discovered by revelation, which are discoverable to us by reason. 2. That no revelation can be admitted against the clear evidence of reason. 3. That there are many things of which we have but imperfect notions, or none at all; and others, of whose past, present, or future existence, by the natural use of our faculties we cannot have the least knowledge; and these, being beyond the discovery of our faculties, and above reason, when revealed, become the proper object of our faith. He then adds, that our reason is not injured or disturbed, but assisted and improved by new discoveries of truth coming from the fountain of knowledge. Whatever God has revealed is certainly true: but whether it be a divine revelation or no, reason must judge, which can never permit the mind to reject a greater evidence to embrace what is less evident. There can be no evidence that any traditional revelation is of divine original, in the words we receive it, and the sense we understand it, so clear and so certain, as that of the principles of reason: and, therefore, nothing that is contrary to the clear and self-evident dictates of reason, has a right to be urged or assented to as a matter of faith, wherein reason has nothing to do. Whatsoever is divine revelation ought to over-rule all our opinions, prejudices, and interests, and has a right to be received with full assent: and such a submission as this, of our reason to faith, takes not away the landmarks of knowledge.

REVELATION *of St. John*, the same with the Apocalypse. See APOCALYPSE.

REVELS, entertainments of dancing, masking, acting comedies, farces, &c. antiently very frequent in the inns of court, and in noblemens houses, but now much disused. The officer who has the direction of the revels at court, is called the master of the revels.

REVENUE, the annual income a person receives from the rent of his lands, houses, interest of money in the stocks, &c.

REVERBERATION, *Reverberatio*, in physics, the act of a body repelling or reflecting another after its impinging thereon. See REPULSION.

REVERBERATION, in chemistry, denotes a kind of circulation of the flame by means of a reverberatory, or the return of the flame from the top of the furnace back to the bottom, chiefly used in calcination. Reverberation is of two kinds: the first with a close fire, that is, a reverberatory furnace, where the flame has no vent at top, being covered with a dome or capital, which repels its action back

back on the matter or the veſſel that contains it, with increaſed vehemence. After this manner is refining, the diſtillation of acids, ſpirits, &c. performed. Reverberation with an open fire, is that performed in a furnace or reverberatory, whoſe regiſters are all open, uſed in calcination, &c. See the next article.

REVERBERATORY, or REVERBERATING FURNACE, a chemical furnace built cloſe all around, and covered at the top with a capital of brick or tiles, ſo as not to give any vent to the heat or flame, but to determine it to reverberate or turn back from the brick-work with new force upon the matter placed at bottom.

When the fire has no vent or paſſage at top, it is a whole reverberatory. When the middle of the capital is open, and only the ſides cloſe, ſo that there is only a half circulation of the flame, it is called a half reverberatory.

The reverberatory furnace is chiefly uſed in the fuſion and calcination of metals and minerals, and on other occaſions where the moſt intenſe heat is required, as in aſſaying, &c. Whence it is alſo called the melting-furnace, and aſſaying-furnace.

REVERIE, the ſame with delirium, raving, or diſtraction. See DELIRIUM, &c.

It is uſed alſo for any ridiculous extravagant imagination, action, or propoſition, a chimera or viſion. But the moſt ordinary uſe of the word, among Engliſh writers, is for a deep diſorderly muſing or meditation.

REVERSION, *Reverſio*, in law, is defined to be returning of lands, &c. into the poſſeſſion of the donor, or his heirs.

Reverſion, in the law of England, has two ſignifications; the one of which is an eſtate left, which continues during a particular eſtate in being; and the other is the returning of the land, &c. after the particular eſtate is ended; and it is farther ſaid, to be an intereſt in lands, when the poſſeſſion of it fails, or where the eſtate, which was for a time parted with, returns to the grantors, or their heirs. But, according to the uſual definition of a reverſion, it is the reſidue of an eſtate left in the grantor, after a particular eſtate granted away ceaſes, continuing in the grantor of ſuch an eſtate.

The difference betwee- a remainder and a reverſion, conſiſts in this, that the remainder may belong to any man except the grantor; whereas the reverſion returns to him who conveyed the lands, &c. See the article REMAINDER.

REVIEW, in war, is the appearance of an army, or part of an army, in order of battle, and their being viewed by the general, that he may know the condition of the troops, ſee that they are complete, and be a witneſs of the expertneſs with which they perform their evolutions, and other exerciſes.

REVISE, among printers, a ſecond or third proof of a ſheet to be printed, taken off in order to be compared with the laſt proof, to ſee whether all the miſtakes marked in it are corrected. See the article PRINTING.

REVULSION, in medicine, turning a flux of humours from one part to another, by bleeding, cupping, frictions, ſinapiſms, bliſters, fomentations, bathings, iſſues, ſetons, ſtrong purging of the bowels, &c.

Dr. Van Sweiten, in his Commentaries upon the Aphoriſms of Boerhaave, obſerves, that the uſe of revulſions in diſeaſes, is confirmed by daily experience as well as by reaſon; for ſo ſoon as the reſiſtance to the blood's motion is either diminiſhed or totally removed in any part of the body, it immediately flows into that part with a greater velocity.

Thus, when all the veſſels and viſcera of the abdomen are ſuddenly freed from a conſiderable preſſure by the birth of an infant, all the blood is frequently derived into thoſe veſſels ſo forcibly, that unleſs the fluid veſſels and viſcera are compreſſed by ſwathing with a roller, the child-bed woman may ſuddenly periſh in a fatal ſwoon, for want of the blood's due preſſure in the veſſels of the brain and cerebellum: the ſame thing alſo happens if the abdomen is not ſwathed, when all the water is diſcharged at once by paracenteſis, in the dropſy.

If, again, we conſider, that the blood propelled by the heart is ſent partly up to the head, and ſuperior parts of the trunk, and partly downward to the viſcera and lower extremities, it will be from hence evident, that, by diminiſhing the reſiſtance of the lower veſſels, or by evacuating them, the quantity and impulſe of the blood will then be derived more towards the inferior parts, and drawn from thoſe that are ſuperior. It is therefore poſſible, to make a revulſion of the arterial blood from an inflamed part to any other, eſpecially when the part, towards which the revulſion is made, receives its blood from the ſame common trunks or larger arteries.

The phyſicians foment the external parts of the head in inflammatory diſorders thereof, that the impulſe of the blood, being increaſed in the branches of the external carotide, may preſs with a leſs force upon the parts contained in the head. And Galen has long ago obſerved, that pains are eaſed almoſt as with a charm, by making a revulſion with cupping-glaſſes.

RHABARBARUM, rhubarb, in botany. See RHUBARB.

RHACOMA, in botany, a genus of plants, the corolla of which is divided into four fimbriated, roundiſh, patent ſegments: the ſtamina are four ſubulated filaments, topped with roundiſh antheræ; and the fruit is a roundiſh unilocular capſule, containing one ſeed of the ſame form.

RHAGADIOLUS, in botany, the ſame with lapſana. See the article LAPSANA.

RHAGOIDES, in anatomy, the ſecond coat or tunic,

tunic of the eye, more usually called uvea. See the article UVEA.

RHAMNOIDES, in botany, Tournefort's name for the hippophae. See HIPPOPHAE.

RHAMNUS, the buckthorn, in botany. See BUCKTHORN.

RHAPHONTICOIDES and RHAPHONTICUM, the same with the centauria. See the article CENTAURIA.

RHAPHONTICUM, is also the name for the root of the rheum. See the article RHEUM.

RHAPSODI, Ῥαψῳδοι, *Rhapsodists*, in antiquity, persons who made a business of singing pieces of Homer's poems.

Cuper informs us, that the Rhapsodi were cloathed in red, when they sung the Iliad, and in blue, when they sung the Odyssee. They performed on the theatres, and sometimes strove for prizes in contests of poetry, singing, &c. After the two antagonists had finished their parts, the two pieces or papers they were written in, were joined together again; whence the name, viz. from ῥαπτω, *suo*, and ᾠδη, *canticum*.

But there seems to have been other Rhapsodi, of more antiquity than these people, who composed heroic poems or songs in praise of heroes and great men, and sung their own compositions from town to town, for a livelihood; of which profession, Homer himself is said to be.

RHAPSODY, ῥαψῳδια, in antiquity, a discourse in verse, sung or rehearsed by a rhapsodist.

Others will have rhapsody to signify a collection of verses, especially those of Homer, which having been a long time dispersed in pieces and fragments, were at length, by Pisistratus's order, digested into books called rhapsodies, from ῥαπτω, *suo*, and ᾠδη, *canticum*. Hence, among moderns, rhapsody is also used for an assemblage of passages, thoughts, and authorities raked together from divers authors, to compose some new piece.

RHEEJA, in botany, a genus of plants, whose flower consists of four concave, oval, patent petals, with a number of filaments. The fruit is ovate, small, succulent, and unilocular, and contains three ovato-oblong seeds.

RHETORIANS, a sect of heretics in Egypt, so denominated from Rhetorius their leader. The distinguishing doctrine of this heresiarch, as represented by Philastrius, was, that he approved of all the heresies before him, and taught that they were all in the right.

RHETORIC, *Rhetorica*, the art of speaking copiously on any subject, with all the advantage of beauty and force.

Lord Bacon defines rhetoric very philosophically, to be the art of applying and addressing the dictates of reason to the fancy, and of recommending them there so as to affect the will and desires. The end of rhetoric, the same author observes, is to fill the imagination with ideas and images which may assist nature without oppressing it. Vossius defines rhetoric, the faculty of discovering what every subject affords of use for persuasion. Hence, as every author must invent arguments to make his subject prevail, dispose those arguments, thus found out, in their proper places, and give them the embellishments of language proper to the subject; and if this discourse be intended to be delivered in public, utter them with that decency and force which may strike the hearer; rhetoric becomes divided into four parts, invention, disposition, elocution, and pronunciation.

Rhetoric and oratory differ from each other as the theory from the practice; the rhetorician being he who describes the rules of eloquence, and the orator he who uses them to advantage. Ordinarily, however, the two are used indifferently for each other.

RHEUM, ῥευμα, a thin serous humour, occasionally oozing out of the glands about the mouth and throat.

RHEUM, the rhubarb, in botany. See the article RHUBARB.

RHEUMATISM, in medicine, a distemper that happens most commonly in spring or autumn, when there is a remarkable change of air from hot to cold, and from cold to hot, or when the wind suddenly shifts to any opposite point. It begins, according to Sydenham, with a shivering and other symptoms of a fever; and in a day or two's time, or sometimes sooner, a vehement pain seizes one or more of the limbs, raging sometimes in one place and sometimes in another, especially in the arms, wrists, shoulders, and knees: very often there is a redness and swelling, and the fever gradually goes off while the pain remains. This distemper often runs out into a great length, continuing sometimes for some months or years, not perpetually, with the same violence, but coming and going, and from time renewing its paroxysms.

It chiefly attacks persons in the flower of their age, after violent exercise, or a great heat of the body from any other cause, and then being too suddenly cooled. Its proximate cause Boerhaave takes to be an inflammation of the lymphatic arteries of the membranes near the ligaments of the joints, but not so violent as to bring on a suppuration. This disease is nearly a-kin to the gout and scurvy, and the blood is like that of those afflicted with the pleurisy. The pain is exasperated upon the least motion; it sometimes attacks the loins and coxendix, and sometimes the brain, lungs, and viscera: when it seizes the loins it is then called lumbago: in this case, Sydenham observes that there is a most violent pain in the small of the back, which sometimes extends to the os sacrum, and is like a fit of the gravel, only the patient does not vomit. If this disease is unskilfully treated, it may continue several

veral months or years, but not always with the ſame violence, but by fits. If it continues and encreaſes, it may cauſe a ſtiff joint, which will ſcarce yield to any remedy.

Sydenham directs to take away ten ounces of blood on the ſide affected; this muſt be repeated three or four times or oftener, once every other or every third day, according as the ſtrength of the patient will bear. The diet muſt be very thin, and an emulſion of the four cold ſeeds may be given; as alſo a pultice of white-bread and milk, tinged with a little ſaffron, may be laid to the part affected: a clyſter of milk and ſugar may be injected on thoſe days the bleeding is omitted. If the patient cannot bear frequent bleeding, after the ſecond or third time, give the common purging potion every other day, and an ounce of diacodium at night, till he recovers.

In an incipient rheumatiſm of the ſhoulders, Hoffman ſays that nothing is better than a bliſter laid between the ſcapulæ; but if it happens to the plethoric, cupping, with ſcarification in the lower parts, repeated every month, does ſignal ſervice. The ſame phyſician thinks it may be proper to chew rhubarb, from two ſcruples to a dram, with raiſins or currants, two or three times a week.

The ſpirit of hartſhorn and the balſam of guiacum, given in the quantity of twenty or thirty drops, three or four times a day, Dr. Shaw ſays, is of great ſervice: but he thinks nothing better than a decoction of the ſudorific woods, to the quantity of a quart a day, for a month or ſix weeks together. This laſt, when aſſiſted with crude antimony and mercurius dulcis, Hoffman recommends in the venereal rheumatiſm, which often ariſes from the remains of a lues venerea contained in the maſs of blood. In a ſcorbutic rheumatiſm, or that ariſing from the ſcurvy, Sydenham directs the patient to take the ſcorbutic electuary and water, if he cannot bear any kind of evacuation.

He obſerves, that young perſons who live temperately may be cured by a ſimple refrigerating diet, and moderate nouriſhing, with as much certainty as by repeated bleeding: for inſtance let the patient live four days upon whey alone; and after that white bread may be allowed for dinner, and on the laſt day of his illneſs he may be allowed it for ſupper. When the ſymptoms ceaſe, he may have boiled chickens, or any thing of eaſy digeſtion, but every third day he muſt live upon whey only, till his ſtrength returns. Boerhaave's method of cure is to the ſame effect, only he adviſes warm baths and ſtrong bliſters to be laid on the part affected, nay even cauteries themſelves: but Hoffman obſerves that great caution ſhould be uſed with regard to topics, for if the patient's conſtitution is ſanguineous they ſhould all be avoided, and the part covered carefully with the bed-cloaths; but if there is a thick, cold, ſtagnating humour in the part, and a ſenſe of cold, with a ſtricture of the pores, then frictions may be uſed with rough warm cloths, and afterwards cupping with ſcarifications. If the part becomes ſtiff and inflexible, with a numbneſs, which is called a pareſis, then take human or canine axungia, two ounces; balſum of Peru, and oil of cloves, each two drams; with which make a liniment for the part: this has been known to have a wonderful effect. Arbuthnot ſays, that cream of tartar in water-gruel, taken for ſeveral days will abate the pains and ſwellings conſiderably by its acidity, correcting the alkaline ſalts of the blood.

Cheyne ſays, that the hot and inflammatory rheumatiſms have all the ſymptoms of the gout, and, like it, change from place to place, and by over violent evacuations may be tranſlated upon the noble organs.

RHEXIA, in botany, a genus of plants, whoſe flower conſiſts of four roundiſh patent petals, inſerted into the cup: the ſtamina are eight filiform filaments, terminated with narrow, obtuſe, declining, furrowed antheræ: the fruit is a roundiſh capſule, formed of four valves, containing four cells, and incloſed in the belly of the cup: the ſeeds are roundiſh and numerous.

RHINANTHUS, rattle, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is almoſt cylindric, and the length of the cup; the limb is opening and compreſſed at the baſe; the upper lip is galeated, compreſſed, emarginated, and narrow; and the lower lip is plane, ſpreading, and cut into three obtuſe parts at the extremity, the middle one being broader: the ſtamina are four filaments, two of which are ſhorter than the others, and terminated with hairy incumbent antheræ: the fruit is an obtuſe, erect, compreſſed capſule, with two cells, containing many compreſſed ſeeds.

The ſeeds and capſules of a ſpecies of this genus, called *Semen Savadillos*, boiled in water, effectually deſtroy vermin, particularly bugs, the parts where they harbour being waſhed therewith.

RHINOCEROS, in zoology, an order of the jumenta, having eleven fore-teeth in each jaw; there are no canine teeth; the noſe is ornamented with a ſingle or double horn, which is permanent. This, of all quadrupeds, approaches neareſt to the elephant in ſize, the body being nearly as bulky, but the legs much ſhorter. A full grown rhinoceros is fourteen feet high, and the legs are ſo ſhort with all this height, that the belly comes near the ground: the head is very large and oblong, of an irregular figure, broad at top and depreſſed towards the ſnout: the ears reſemble thoſe of a hog: the eyes are very ſmall, and ſituated at a ſmall diſtance from the extremity of the ſnout: on the upper part of the ſnout, near the extremity, ſtands the horn, growing to about two feet and a half in length, bent a little back, of a black colour, and vaſtly firm and hard: the ſkin is remarkably thick and hard, ſo

that

that the creature could not turn his body in any direction but for the joints and folds in it: the tail is ſhort, and furniſhed with ſome long and extremely thick black hairs.

RHIZOPHORA, in botany, a genus of aquatic plants, whoſe flower conſiſts of four oblong petals, almoſt the length of the cup, with ſcarce any filaments, and ſmall acuminated antheræ: the fruit is fleſhy and almoſt egg-ſhaped, containing one ſeed, which is of an oblong acuminated figure.

This genus is the Mangles of Plumier, and is called Mangrove by the inhabitants of the Weſt-Indies.

RHODIOLA, in botany, a genus producing male and female flowers on different plants; the male flower conſiſts of four oblong, obtuſe, deciduous petals, with four erect emarginated nectaria, and eight ſubulated ſtamina; the female flower hath four erect, obtuſe, perſiſtent petals, with the nectaria the ſame as the male: the fruit conſiſts of four corniculated capſules, opening inwards, and contains a great many roundiſh ſeeds.

RHODIUM LIGNUM, RHODIAN-WOOD, in botany, the ſame with aſpalathum. See the article ASPALATH.

RHODODENDRUM, in botany, a genus of plants, whoſe flower is monopetalous and of a rotated funnel-ſhaped figure; the ſtamina are ten ſlender filaments, topped with oval antheræ; the fruit is a ſubangulated oval capſule, having five cells, which contain a great number of very ſmall ſeeds.

RHODORA, in botany, a genus of plants, whoſe flower conſiſts of three petals; the upper ones of which are equal and lanceolated, and the other is concave and leſs; the ſtamina are ten ſlender declining filaments, terminated with roundiſh twin antheræ; the fruit is an ovate capſule, having five cells, which contain a great number of minute ſeeds.

RHODON, in pharmacy, an appellation given to ſeveral compoſitions, on account of roſes being the chief ingredient in them; as the diarrhodon, rhodoſaccharum, &c.

RHOMBOIDES, in geometry, a quadrilateral figure whoſe oppoſite ſides and angles are equal, but is neither equilateral nor equiangular.

RHOMBOIDES, in anatomy, a thin, broad, and obliquely ſquare fleſhy muſcle, ſituated between the baſis of the ſcapula and the ſpina dorſi; ſo called from its figure. Its general uſe is to draw, backward and upward, the ſubſpinal portion of the baſis ſcapulæ.

RHOMBUS, in geometry, an oblique-angled parallelogram, or a quadrilateral figure whoſe ſides are equal and parallel, but the angles unequal, two of the oppoſite ones being obtuſe, and the other two acute.

RHOPHALIC VERSES, in antient poetry, a kind of verſes, which beginning with monoſyllables, were continued in words growing gradually longer and longer to the laſt.

RHUBARB, *Rheum*, in botany, a plant whoſe flower is monopetalous, narrow at the baſe, and impervious, with the limb divided into ſix obtuſe ſegments, which are alternately ſmaller; the ſtamina are nine capillary filaments, inſerted in the corolla, and terminated with oblong, blunt, and twin antheræ: there is no pericarpium; the ſeed is ſingle, large, three-cornered, acute, and ſurrounded with membranaceous borders. The leaves are placed on long footſtalks, which riſe immediately from the root; they are heart-ſhaped, ſmooth, ribbed on their underſide, and waved on their edges; the ſtalk riſes to the height of four feet; it is of a pale green, furniſhed with a ſmall leaf at each joint, and the uppermoſt divided into branches ſupporting numerous panicles of flowers, which appear in June.

This plant is ſuppoſed to be the true Tartarian rhubarb, the root of which (ſo well known in medicine) is thick, of an oblong figure, large at the head, and tapering pretty ſuddenly as it extends in length; it is ſometimes ſingle, but more uſually divided into two or three parts at the lower end. It is brought to us in unequal pieces, from four to five or ſix inches in length, and three or four thick; it is a little heavy, and of a duſky yellow without ſide, but within is marbled or variegated with yellow and red in the manner of a nutmeg; it is of a ſomewhat lax and ſpongy texture, of a ſub-acid bitteriſh and ſomewhat aſtringent taſte, with an agreeable aromatic ſmell.

Rhubarb is to be choſen freſh, tolerably hard, and moderately heavy, and ſuch as does not duſt the fingers in handling; ſuch as, infuſed a few minutes in water, gives it a fine yellow, and when bruiſed in a mortar has a reddiſh colour with the yellow. Rhubarb is not ſo often adulterated as damaged; care is to be taken that it be not wet or rotten: much of it is ſubject, after ſteeping too long, to be worm-eaten and full of holes on the ſurface.

It has been learnedly controverted by botaniſts, whether the antients were acquainted with the true rhubarb; their ſort appears to be the rapontic, or Engliſh rhubarb, which is another ſpecies of rheum, the roots of which are greatly inferior to thoſe of the true kind. It is brought to us from Ruſſia and from the Eaſt-Indies; it grows in great plenty on the confines of China and Tartary, and in many parts of Tartary itſelf; the mountains of Tibet abound with it, and a very conſiderable part of what is ſent into Europe, grows there.

It was long before the true rhubarb-plant was known in Europe; but of late years it has been introduced among us, and as it will thrive in this climate very well, we may reaſonably entertain the agreeable

agreeable expectations, that a ſufficient quantity of this valuable drug will be raiſed in a few years, ſo as at leaſt to ſupply our own conſumption.

The propagation of theſe plants is by ſeeds, which ſhould be ſown in autumn, ſoon after they are ripe, in the place where they are intended to remain, as the plants ſhould not be removed. In the ſpring they will make their appearance, when they ſhould be howed out, as practiſed with carrots, leaving them at the laſt hoeing out at the diſtance of about a foot and a half aſunder, after which they require no other care than to keep them clear from weeds; in autumn the leaves of theſe plants decay, then the ground ſhould be made clean; and in the ſpring, before the plants begin to put forth new leaves, the ground ſhould be hoed and made clean again.

The ſecond year after the plants come up, many of the ſtrongeſt will produce flowers and ſeeds; but the third year moſt of them will flower: the ſeeds, when ripe, ſhould be gathered, and not ſuffered to ſcatter, leſt they ſhould grow to injure the old plants. The roots of theſe plants will remain many years without decaying; and, it is ſaid, the old roots of rhubarb are much preferable to the young ones.

They delight in a rich ſoil, not too dry, nor over moiſt, and where there is a good depth for their roots to run down; in ſuch land, their leaves will be very large, and their roots will grow to a great ſize.

Rhubarb greatly ſtrengthens the ſtomach and bowels, and is an excellent medicine againſt choler, and other diſtempered contents of the inteſtinal and meſenteriac glands: it is given, with great ſucceſs, in all obſtructions of the liver, in the jaundice, diarrhœa, fluor albus, and gonorrhœa; and the kidneys do not lie too remote from its influences, for it frequently paſſes ſo much that way, as to diſcover itſelf in the colour of the urine; it, therefore, is very good in obſtructions of the reins and uterus; but in the jaundice, it almoſt paſſes for infallible: it is good againſt worms in children, and is the beſt purge that can be given them to clear away thoſe crudities in the bowels, which are apt to breed them: it alſo gives a firmneſs to the fibres, which, from the ſlipperineſs of children's diet, are generally too lax, ſo that its repetition to them can hardly be too frequent.

Rhubarb is given in powder, in infuſion, and in its own crude ſolid ſtate, the chewing it being, perhaps, the beſt way of giving it of all others. When it is intended to ſtrengthen the ſtomach and aſſiſt digeſtion, the quantity of twenty-five grains, or thereabout, ſhould be chewed daily on theſe occaſions, an hour before eating: this is alſo the beſt way of taking it againſt obſtructions of the viſcera.

Its doſe, in powder, is from half a ſcruple to two ſcruples; in infuſion, about a dram of it will purge gently, but the doſe may be increaſed to two drams: it is obſervable, that neither the infuſion nor the decoction, nor even the extract, of rhubarb, purge near ſo briſkly as the root itſelf in powder.

Monks-RHUBARB, *Lapathum*. See the article LAPATHUM.

RHUMB, RUMB, or RUM, in navigation, a vertical circle of any given place, or the interſection of ſuch a circle with the horizon; in which laſt ſenſe rhumb is the ſame with a point of the compaſs. See the article COMPASS.

RHUS, *Sumach*, in botany, a genus of plants, whoſe flower conſiſts of five ovate erect patent petals, with five very ſhort filaments, topped with ſmall antheræ ſhorter than the corolla; the piſtillum hath ſcarce any ſtile, and crowned with three ſmall heart-ſhaped ſtigmata; the fruit is a roundiſh hairy berry, containing a ſingle oſſeous ſeed: this genus comprehends ſeveral ſpecies, among which are included by Linnæus the cotinus and toxicodendrous of Tournefort. The leaves and ſeeds of the elm-leaved ſumach are uſed in medicine, and are accounted aſtringent and ſtyptic, and good for all kinds of fluxes and hæmorrhages. This ſpecies grows naturally in the ſouthern parts of Europe, as alſo in Turkey, where the branches are uſed for tanning leather.

RHYME, RHIME, RYME, or RIME, in poetry, the ſimilar ſound, or cadence and termination of two words which end two verſes, &c. Or rhyme is a ſimilitude of ſound between the laſt ſyllable or ſyllables of a verſe, ſucceeding either immediately or at a diſtance of two or three lines.

Rhymes are either ſingle, double, or triple, though the two laſt are much diſuſed. Single rhymes are divided into perfect or whole rhimes, and imperfect or half rhymes. A whole or perfect rhyme is where there is a ſimilitude of ſound without any difference: an imperfect rhyme is where there is a ſimilitude of ſound, with a difference either in reſpect of the pronunciation or orthography, but chiefly the former. Single rhymes are again divided into feminine and maſculine rhymes: the feminine rhyme is that where the laſt ſyllable of the rhyme ends with an *e* mute: and the maſculine rhymes are thoſe of all other words. Double rhymes are thoſe where two words terminate alike through the whole two laſt ſyllables. Plain rhymes are thoſe where the two rhyming verſes ſucceed immediately to each other: and croſs rhymes are thoſe where the verſes are ſo diſpoſed as that the firſt rhymes with the third, and the ſecond with the fourth.

There is no rule in poetry, ſays Du Bos, whoſe obſervance coſts ſo much trouble, and is productive of leſs beauties in verſe, than that of rhyming. Rhyme frequently maims and almoſt always enervates the ſenſe of the diſcourſe, for one bright thought which the paſſion of rhyming throws in our way by chance, is, without doubt, every day the

cauſe of a hundred others that people would bluſh to make uſe of, were it not for the richneſs or novelty of the rhyme with which theſe thoughts are attended.

And yet the allurement of rhyme has nothing in it worth comparing to the charms of numbers and harmony. The terminating of a ſyllable with a particular ſound is no beauty in itſelf. The beauty of a rhyme is only a relative one, which conſiſts in a conformity of termination between the two laſt of two correſponding verſes. This ornament therefore, which is of ſo ſhort a duration, is perceived only at the end of two verſes, and after having heard the laſt word of the ſecond verſe, which rhymes to the firſt. One is not even ſenſible of this pleaſure, but at the end of three or four verſes, if the maſculine and feminine rhymes are interwoven, ſo that the firſt and fourth be maſculines, and the ſecond and third feminines: a mixture which is very much uſed in ſeveral kinds of poetry. But even in thoſe verſes where the richneſs thereof diſcovers itſelf at the end of the ſecond verſe, it is the greater or leſſer conformity between the two laſt words of theſe verſes, which forms its elegance. Nor, for the moſt part, do people upon hearing the ſecond rhyme, recal the firſt diſtinctly enough, to be charmed with their perfection. Their merit is known rather by reflection than ſenſation, ſo trifling is the pleaſure by which it tickles the ear. Numbers and harmony are a light which throws out a conſtant luſtre; but rhyme is a mere flaſh, that diſappears after having given only a ſhort-lived ſplendor.

RHYTHM, *ῥυθμος*, in muſic, the variety in the movement, as to the quickneſs or ſlowneſs, length or ſhortneſs of the notes. Or, it may be defined more generally, the proportion which the parts of the motion have to each other.

RIBES, the currant-buſh, in botany. See the article CURRANT.

RIBS, *Coſtæ*, in anatomy, certain long arched bones, ſerving to form or ſuſtain the inner ſides of the thorax. See the article THORAX.

The ribs are twenty-four in number, twelve on each ſide; their figure is an imperfect ſegment of a circle: their ſize is very different, the middle ones being largeſt, and the upper and lower much ſmaller: they are harder, rounder, and more incurvated towards their articulations with the vertebræ, than at the other extremity towards the ſternum, which is thinner, broader, and more ſpongy. The ribs are diſtinguiſhed into true and ſpurious; the true ribs are the ſeven upper pair, which are thus diſtinguiſhed, as forming the moſt perfect arches, and as having a ſtrong articulation with the ſternum. The five lower are called nothæ, or ſpurious ribs, as being ſmaller, ſhorter, and more cartilaginous than the reſt, and not reaching ſo far as the ſternum, which make their articulations very lax, in regard they terminate in long ſoft cartilages, which bending upwards, are joined to the upper ribs. The ſeveral ribs have been diſtinguiſhed by many authors, each under its peculiar name; but this is not neceſſary, as they are as eaſily known by the names firſt, ſecond, &c. On the inſide of the true ribs, except the loweſt, and ſometimes the next to it, runs a pretty deep ſinus, reaching from the end next the ſpine, almoſt to its juncture with the cartilage. In the anterior extremities the cartilages of the ſeven true ribs are all joined to the ſternum; the eighth, ninth, and ſometimes the tenth, cohere either with the ſternum, or mutually adhere to one another, by means of their tranſverſe cartilages. The anterior extremities of all the others are looſe and free, between the muſcles of the abdomen and the diaphragm. In the poſterior extremities there are in moſt of them two capitulæ, or heads, which are firmly joined to the vertebræ of the back, yet ſo as to form moveable articulations; for the uſe of which, ſee the article RESPIRATION.

The ribs are liable both to fractures and luxations. In a ſlight fracture, the ſeparated bones are to be put into their places, a compreſs dipped in ſpirit of wine is to be laid on, and then covered with ſplints and a circular bandage. If any ſharp pieces of the ribs ſhould pierce the pleura, &c. it will be proper to open the ſkin, and extract the fragment. The ribs are but ſeldom diſlocated; but when this happens, they are to be replaced as ſoon as poſſible. See FRACTURE and LUXATION.

RIBWORT, in botany. See the article PLANTAIN.

RICCIA, in botany, a genus of cryptogamious plants, of the flag kind, conſiſting of a foliaceous matter, procumbent on the ground, on which there are evident male and female fructifications, ſometimes both on the ſame, and ſometimes on different plants of the ſame ſpecies; the male flower has neither calyx nor corolla, but conſiſts of a ſingle veſſile awl-ſhaped truncated anthera, opening at the top and growing to the leaves; the female flower has no corolla and ſcarce any calyx, conſiſting principally of a globoſe unilocular pericarpium, in which is contained a great number of ſeeds.

RICE, *Oryza*, in botany. See the article ORYZA.

RICHARDIA, in botany, a genus of plants, whoſe flower is monopetalous and of a cylindraceous funnel form, with the limb divided into ſix erect acute ſegments, with the ſame number of ſtamina; there is no pericarpium, the ſeeds are three in number, round on one ſide, and angulated on the other, broader at the top, and gibbous.

RICINUS, in botany, a genus, producing male and female flowers on the ſame plant, which are both deſtitute of a corolla; the cup of the male is divided into three oval and concave ſegments; the filaments

filaments are a very numerous ſlender joining in ſeveral bodies, and topped with roundiſh twin antheræ: the female flower-cup is divided into five ovate concave deciduous ſegments, containing three piſtils, and the fruit is a roundiſh three furrowed capſule, conſiſting of three valves, and containing the cells, each including one almoſt oval ſeed.

Moſt of the ſpecies belonging to this genus are natives of the Weſt-Indies. From the ſeeds of theſe plants the inhabitants extract an oil for the uſe of lamps; the ſeeds have been given formerly to purge watery humours; but are rather too violent to be uſed with ſafety, and are therefore now much in diſuſe.

RICKETS, *Rachitis*, in medicine, a diſorder incident to children, proceeding from an unequal nutrition.

Children are ſeldom attacked with rickets before they are nine months old, and after they are two years old. It may originally proceed from the diſorders of the parents, and may be increaſed by thoſe of the nurſe. It is alſo promoted by feeding the child with aqueous and mucous ſubſtances, crude ſummer-fruits, fiſh, and too great a quantity of ſweet things; by ſitting too much, eſpecially in a perforated chair, with its coats up; by a ſtriking in of the itch, &c.

This diſorder is known from a flaccid tumour of the head and face, a flabby looſe ſkin, a ſwelling of the belly, and a falling away of the reſt of the other parts, eſpecially of the muſcles; from protuberances of the apophyſes of the joints, ſuch as the wriſts, ankles, and knees, from the largeneſs of the jugular veins and arteries, while the reſt decreaſe; from knotty ribs, a narrow breaſt, and carious teeth, &c.

The cure, according to Boerhaave, is to be attempted with light, nouriſhing, dry aliment; not fat, but ſeaſoned, and taken often; with little ſound drink, ſuch as mild beer, or ale; with a dry warm air, and warm woollen clothing; with being carried about in the arms, or drawn in a vehicle over the ſtones, and often ſhook, ſwung, and put in motion; with repeated frictions, eſpecially of the belly and ſpine of the back with warm dry flannel, ſprinkled with aromatics; with gentle emetics, frequently though prudently repeated; with ſtrengthening purges for ſeveral days ſucceſſively; and with cold bathing, the child being put to ſweat between blankets every day, as ſoon as he comes out of the water.

Particularly for food, the bread ſhould be biſcuit, with a little ſaffron and ſpices; the fleſh ſhould be pigeons, pullets, veal, rabbits, mutton gently roaſted, minced and mixed with biſcuit, ſalt, a little parſley, thyme, nutmeg, or the like. He may alſo eat rice, millet, or pearl barley, boiled with raiſins, to which add a little wine and ſpice.

The drink may be red wine, of which an ounce may be given three or four times a day; as alſo Brunſwic mum and Engliſh beer, which, in the ſummer, may be mixed with ſpaw-water. Let the pillow and bed be filled with the following leaves dried in the ſhade, viz. of male fern, three pounds; of marjoram, baum, and mint, each two handfuls; and of the flowers of melilot, ſweet-trefoil, elder, and roſes, dried in the ſhade, of each two ounces: reduce them all to powder, and mix them with double the quantity of barley-chaff.

RIDE, in the ſea-language, is a term variouſly applied: thus a ſhip is ſaid to ride, when her anchors hold her faſt, ſo that ſhe does not drive, by the force either of the wind or tide. A ſhip is ſaid to ride acroſs, when ſhe rides with her fore and main yards hoiſted up to the hounds, and both yards and arms topped alike. She is ſaid to ride well, when ſhe is built ſo as not to over-beat herſelf in a head-ſea, the vaves over raking her from ſtem to ſtern. To ride athwart, is to ride with her ſide to the tide. To ride betwixt wind and tide, is to ride ſo as the wind has equal force over her one way, and the tide the contrary way. If the wind has more power over the ſhip than the tide, ſhe is ſaid to ride wind-road, or to ride a great wind. And ſhe is ſaid to ride a-portoiſe, when the yards of a ſhip are ſtruck down upon the deck.

RIDE, of hazel, or other wood, is a cluſter of ſprigs ſhooting out from the ſame root.

RIDEAU, in fortification, is a ſmall elevation of earth, extending lengthwiſe on a plane, and ſerving to cover a camp, or to give an advantage to a poſt. Rideaus are alſo convenient for thoſe who would beſiege a place, and ſerve to ſecure the workmen in their approaches to the foot of a fortreſs.

Rideau is alſo uſed ſometimes for a trench, the earth of which is thrown upon its ſides, to ſerve as a parapet for covering the men.

RIDER, a term uſed for an after-clauſe added to a bill while depending in parliament.

RIDERS, in a ſhip, are large timbers, both in the hold and aloft, bolted on to other timbers to ſtrengthen them, when the ſhip is diſcovered to be too ſlightly built.

RIDGE, in agriculture, a long piece of riſing land, between two furrows.

Mr. Tull obſerves, that the method of ploughing lands up into ridges is a particular kind of tillage, the chief uſe of which is the alteration it makes in the degrees of heat and moiſture. But the principal advantage this gentleman propoſes from ridges is the draining wet hills, where the upper ſtratum is mould, and the ſecond ſtratum clay. Theſe ridges he obſerves ſhould be plowed acroſs the hill, almoſt horizontally, that their parting furrows lying open, may each ſerve as a drain to the ridge next below it; for when the plough has made the

the bottom of these horizontal furrows a few inches deeper than the surface of the clay, the water will run to their ends very securely, without rising into the mould, provided no part of the furrows be lower than their ends. These ridges and their parting furrows must be made more or less oblique, according to the form and declivity of the hill; but the more horizontal they are, the sooner the rain-water will run off the lands: for in that case, it will run to the furrows, and reach them at right angles. Every one of these horizontal trenches receives all the water from the rills, or little gutters, which in these quagmire-hills run betwixt the mould and the clay; these are all cut off by the trenches, which receive the water at their upper sides, and carry it away, as the gutters of lead, placed under the eaves of a house, carry away the rain-water. These ridges should be plowed in pairs, without throwing any earth into the trenches; and at every time of ploughing, the pairs must be changed, so that the furrow which had two ridges turned towards it one time, must have two turned from it the next.

RIDGE, in building, the highest part of the roof or covering of a house.

RIDGES *of a horse's mouth*, are wrinkles or risings of flesh in the roof of the mouth, running a-cross from one side of the jaw to the other with furrows between them. On the third or fourth of these ridges the farriers strike with a horn, in order to bleed a horse, whose mouth has been over-heated.

RIDGLING, or RIDGEL, among farriers, &c. the male of any beast that has been but half gelt.

RIDICULE, in matters of literature, is that species of writing, which excites contempt with laughter.

RIGADOON, a gay and brisk dance, borrowed originally from Provence in France, and performed in figure, by a man and a woman.

RIGGING *of a Ship*, is all her cordage and ropes, belonging to her masts, yards, &c. See SHIP, ROPE, CORDAGE, &c.

RIGHT, in geometry, signifies the same with straight: thus, a straight line is called a right one. See LINE.

As for right angle, right ascension, right cone, right descension, right sine, right sphere, &c. they are explained under the articles ANGLE, ASCENSION, &c.

RIGHT, *Jus*, in law, not only denotes property, for which a writ of right lies, but also any title or claim, either by virtue of a condition, mortgage, &c. for which no action is given by law, but an entry only.

RIGIDITY, in physics, denotes a brittle hardness. See the article HARDNESS.

It is opposed to ductility, malleability, and softness. See DUCTILITY, &c.

RIGLET, or REGLET. See REGLET.

RIGOR, in medicine, a convulsive shuddering, from severe cold, an ague-fit, or other disorder.

RIM, in a watch, or clock, the edge or border of the circumference or circular part of a wheel.

RIND, the skin of any fruit that may be cut off or pared.

The outer coat of the chesnut, set with prickles, is particularly termed the urchin-like rind.

Rind is also used for the inner bark of trees or that whitish soft substance which adheres immediately to the wood.

In the modern theory of vegetation, the sap is supposed to pass through the rind, in its return from the extremities of the branches to the root. Others suppose its vessels to do the office of arteries, whence Mr. Bradley calls them arterial vessels.

RING, an ornament of gold, silver, &c. made of a circular form, and generally worn on the finger.

RING-BONE, in farriery, a hard callous substance, growing in the pastern of a horse, above the coronet: it is thus called from its growing quite round like a ring.

RING-DIAL. See the article DIAL.

RING-WORM, in medicine, the same with the serpigo. See the article SERPIGO.

Fairy RING, or CIRCLE. See FAIRY.

Saturn's-RING, in astronomy. See the article SATURN.

RIOT, in law, is where three or more persons, assembled together commit some unlawful act, with force and violence, to the disturbance of the peace; as beating some person, forcibly entering upon the possession of the lands, houses, &c. of another, or breaking down inclosures, houses, &c.

RIPENERS, in surgery, medicines that promote suppuration, otherwise called suppuratives. See SUPPURATIVES.

RISING, *Ortus*, in astronomy, the appearance of the sun, a star, &c. above the horizon of any place.

There are three kinds of poetical rising of the stars, viz. acronycal, cosmical, and heliacal. See ACRONYCAL, &c.

The heavenly bodies always appear above the horizon before they really arrive at it, on account of refraction. See the article REFRACTION.

RITE, *Ritus*, among divines, denotes the particular manner of celebrating divine service, in this or that country. See the article RITUAL.

RITORNELLO, or REPEAT, in music, the burden of a song, or the repetition of the first or other verses of a song at the end of each stanza or couplet.

RITUAL, a book directing the order and manner to be observed in celebrating religious ceremonies,

nies, and performing divine ſervice in a particular church, dioceſe, order, or the like.

RIVER, *Fluvius*, or *Flumen*, a current or ſtream of freſh water flowing in a bed or channel, from its ſource into the ſea. See the article SPRING.

RIVULET, a diminutive of river. See the article RIVER.

RIVINIA, in botany, a genus of plants whoſe flower is apetalous; the cup is perſiſtent and coloured, and divided into four oval concave ſegments; the fruit is a globoſe berry placed in the cup, and contains a roundiſh hard ſeed.

ROACH, in ichthyology, a ſpecies of cyprinus, with the iris and belly fins uſually red: it is generally, when full grown, nine inches long, but it ſometimes grows conſiderably larger. See the article CYPRINUS.

ROACHING *of alum*, is the laſt proceſs in making alum, which, being ſufficiently waſhed in a ciſtern of ſtrong alum water, is put into large pans, and a quantity of water added to it; and then being ſet over the fire to melt, and boil a little, it is ſcooped into a great caſk, where it is ſuffered to ſtand and cryſtalize, and is what they call roach, roached, or rock alum.

ROAD, an open way, or public paſſage, forming a communication between one place and another.

ROAD, in navigation, is a place of anchorage at ſome diſtance from ſhore, where veſſels uſually moor to wait for a wind or tide proper to carry them into harbour, or to ſet ſail.

When the bottom is firm, clear of rocks, and ſheltered from the wind, it is called a good road; and when there is but little land on any ſide, it is termed an open road.

ROAN-TREE, *Sorbus*, in botany. See the article SORBUS.

ROASTING, in metallurgy, the ſeparation of volatile bodies from thoſe which are more fixed, by the combined action of air, and fire; and is generally the firſt proceſs in the ſeparation of metals from their ores: it differs from ſublimation only in this, that in this operation the volatile parts are diſſipated when reſolved into vapours; whereas in that, they are preſerved. See SUBLIMATION.

ROB, in pharmacy, the juices of fruits purified and inſpiſſated till it is of the conſiſtence of honey.

ROBBERY, in law, a felonious taking away another man's goods, from his perſon, preſence, or eſtate, by putting him in fear.

ROBERVALLIAN LINES, certain lines uſed for the tranſmutation of figures, and ſo called from their inventor M. de Roberval.

ROBINIA, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is roundiſh, large, patent and obtuſe; the wings are oblong ovate, with ſhort obtuſe apendices, and the carina is almoſt half round, compreſſed, blunt, and the length of the wings; the fruit is a large compreſſed, long, gibbous pod, containing a few kidney ſhaped ſeeds.

The flowers of ſome of the ſpecies, make a beautiful appearance, but being natives of the Weſt-Indies, the plants require a hot-houſe for their preſervation in this climate.

ROCAMBOLE, in botany, a ſpecies of garlic. See the article GARLIC.

ROCK-ROSE, *Ciſtus*, in botany. See the article CISTUS.

ROCKET, in pyrotechny, an artificial fire-work, conſiſting of a cylindrical caſe of paper, filled with a compoſition of certain combuſtible ingredients; which being tied to a ſtick, mounts into the air, to a conſiderable height, and there burſts.

ROCKET, in botany, the Engliſh name for a beautiful ſpecies of heſperis, it is a biennial plant, and increaſed by cuttings in the ſummer; they require a ſtrong land, and flower in June; thoſe with double flowers are moſt regarded.

Water-ROCKET, in botany. See SESYMBRIUM.

ROD, a wand, or long ſlender ſtaff.

ROD is alſo uſed for a land meaſure of ſixteen feet and a half: the ſame with perch and pole.

ROD, in gauging. See GAUGING.

Black-ROD, a ſtaff carried by the king's gentleman uſher, as a badge of his office; this rod or ſtaff is black, and has a lion in gold on its top.

ROE, the ſpawn or ſeed of fiſh. That of the male-fiſhes is uſually diſtinguiſhed by the name of ſoft-roe, or milt, and that of the female, by hard-roe, or ſpawn.

ROE is alſo one of the beaſts of chaſe, of the deer kind. See CERVUS.

The roe buck is called, the firſt year, a hind; the ſecond, a gyrle; the third, an henuſe; the fourth, a roe-buck of the firſt head; and the fifth, a fair roe-buck.

ROELLA, in botany, a genus of plants, whoſe flower is monopetalous and funnel ſhaped, divided at the limb into five erecto-patent ſegments, with five ſcaly nectariums, which are connivent and placed in the bottom of the corolla; the ſtamina are five ſubulated filaments, ſitting in the nectarium, and terminated with connivent awl-ſhaped antheræ: the fruit is a cylindraceous capſule, ſhorter than the cup, having two cells, which contain numerous angulated ſeeds. This genus has ſome affinity to the campanula.

ROGATION, in the Roman juriſprudence, a demand made by the conſuls, or tribunes of the Roman people, when a law was propoſed to be paſſed. Rogatio is alſo uſed for the decree itſelf made in conſequence of the peoples giving their aſſent to this demand, to diſtinguiſh it from a ſenatus conſultum, or decree of the ſenate.

topped with three-cornered antheræ. The fruit is formed of the fleſhy baſe of the cup, and is of a turbinated form, coloured, ſoft, containing one cell, drawn together at the neck, and coronated with ſome irregular laciniæ, and includes many oblong hairy ſeeds faſtened on each ſide of the cup.

The varieties of double roſes are numerous; and we may venture to ſay, that there is no ſhrub yet known that equals the roſe, if the fragrancy and beauty of the flowers are conſidered together. The moſt beautiful and rare is a ſpecies lately introduced into England from Penſylvania, by that very curious gardener and nurſery-man Mr. Bandel of Greenwich, who has them in the greateſt perfection. All the ſorts of roſes are propagated either by ſuckers or layers; the beſt ſeaſon for laying is in October, which is alſo the proper time for planting, though in moiſt land the ſpring is as well.

The flowers of the red roſe are reckoned aſtringent, cleanſing, and proper to ſtrengthen the ſtomach, to ſtop hæmorrhages, vomiting, and fluxes; thoſe of the damaſk-roſe are purgative; and the fruit of the wild-roſe or briar is pectoral. The roſe-water of the ſhops, diſtilled from the flowers of the damaſk-roſe, has been celebrated for many virtues; but its fragrant ſmell is the only quality regarded in it. There is alſo a ſyrup made either from the juice or infuſion of the freſh flowers of the damaſk-roſe.

China-ROSE. See HIBISCUS.

Gilder-ROSE. See VIBURNUM.

Rock-ROSE. See CISTUS.

ROSE *of Jericho*, *Anaſtatica*, in botany, a plant which grows naturally in Syria; it is low and annual, dividing into many irregular woody branches near the root; at each joint is placed a ſingle, oblong, hoary leaf; and at the ſame places come out ſmall ſingle flowers of a whitiſh-green colour, each compoſed of four petals diſpoſed in the form of a croſs; theſe are ſucceeded by ſhort wrinkled pods, having four ſmall horns, opening into two cells, each containing a ſingle brown ſeed. This plant has the ſingular property, that after being kept dry for ſeveral years, if it is put into water it will dilate and expand itſelf, ſo as to open and diſcloſe the ſeed-veſſels and ſeeds in a very extraordinary manner; and is therefore kept by the curious in their repoſitories. It is propagated by ſeeds, which ſhould be ſown in the beginning of April, on a border of light ſandy earth, where it is intended to remain.

ROSE-ROOT, *Rhodiola*. See the article RHODIOLA.

ROSE, in architecture, an ornament cut in the form of a roſe, chiefly uſed in corniches, frizes, vaults of churches, &c. and particularly in the middle of each face in the Corinthian abacus.

ROSE-NOBLE, an Engliſh gold coin, firſt ſtruck in the reign of Edward III. It was formerly current at 6s. 8d. and ſo called becauſe ſtamped with a roſe.

ROSEMARY, *Roſemarinus*, in botany, a genus of plants, whoſe flower is monopetalous and ringent, the upper-lip of which is ſhort, erect, and bifid, with the margin reflexed; the under-lip is reflexed and trifid, the middle ſegment being large, concave, and narrow at the baſe; the ſtamina are two ſubulated filaments, inclining to the upper-lip, and topped with ſingle antheræ; there is no pericarpium, the bottom of the cup containing four ovate ſeeds.

Roſemary grows wild in many parts of Spain, France, and Italy, and is cultivated in our gardens; it is propagated by cuttings or ſlips taken off in the ſpring of the year and planted in a bed of light freſh earth, and in the following autumn they may be tranſplanted where they are intended to remain.

In medicine, the flowers and leaves of the narrow-leaved roſemary are made uſe of both for internal and external purpoſes; they are full of volatile parts, as appears by their taſte, ſmell, and analyſis. They ſtrengthen the brain and ſight, and ſweeten the breath, are good againſt the palſy and epilepſy, as well as obſtructions of the viſcera; they reſtore the tone of the ſolids, and incide and attenuate groſs humours: the conſerve of the flower is cordial, ſtomachic, and cephalic; and from the flowers and young leaves the celebrated Hungary water is made, by being digeſted in ſpirits of wine; and the ſpirit diſtilled off a ſmall quantity of which, diluted with common water, is reckoned excellent in diſlodging and bringing away wax from the ears. Boerhaave looks upon the eſſential oil to be the beſt remedy againſt the epilepſy, and a few drops of it are to be given in wine; the uſual doſe is five or ſix drops.

ROSICRUCIANS, or ROSYCRUCIANS. See ROSYCRUCIANS.

ROS-SOLIS, ſun-dew, an agreeable ſpirituous liquor, compoſed of burnt brandy, ſugar, cinnamon, and milk-water; and ſometimes perfumed with a little muſk: it is ſo called, as being at firſt prepared wholly of the juice of the plant ros-ſolis, or droſera.

ROSTRA, in antiquity, a part of the Roman forum, whereon orations, pleadings, funeral harangues, &c. were delivered.

ROSTRUM literally denotes the beak or bill of a bird; and hence it has been figuratively applied to the beak, or head of a ſhip.

ROSTRUM, in chemiſtry, implies the noſe or beak of a common alembec, which conveys the liquor diſtilled into its receiver. See the article ALEMBIC.

ROSYCRUCIANS, ROSICRUCIANS, or *Brothers of the Roſy Croſs*, a name aſſumed by a ſect or cabal of hermetical philoſophers, who appeared, or at leaſt were firſt taken notice of, in Germany, in the beginning of the ſixteenth century. They pretended

tended to be maſters of all ſciences, and to have many important ſecrets, particularly that of the philoſopher's ſtone. See the article PHILOSOPHER.

Their ſociety is frequently denoted by the abbreviatures F. R. C.

ROT, a diſeaſe incident to ſheep, ariſing from wet ſeaſons, and too moiſt paſture.

It is a very hard thing to prevent the rot, if the year proves very wet, eſpecially in May and June. Salt marſhes, and lands where broom grows, are the beſt places of preſervation for them. Sheep are ſometimes all cleared of the rot, when not too far gone with it, only by removing them into broom-fields. Scurvy-graſs, muſtard, parſley, and thyme are alſo good for the prevention of it.

Some propoſe the giving ſheep half a handful of bay-ſalt every month, or oftener; and there is great probability that this may be of ſervice; but the rational way of attacking all diſorders in cattle, is by conſidering what are the cauſes of them. It will appear, upon enquiry, that wet ſeaſons are the general occaſions of the rot in ſheep, and therefore it would be adviſeable for the owners, when ſuch ſeaſons come on, to remove thoſe animals into the drieſt paſtures they can, and then to feed them principally with dry ſweet hay, oats, bran, and the like; this would prevent the occaſion: and if they were already a little infected, ſome ſalt given with their dry food, would be a happy means of curing them.

ROTA, wheel, in mechanics. See the article WHEEL.

There is a celebrated problem in mechanics, called rota Ariſtotelica, Ariſtotle's wheel, becauſe that philoſopher was the firſt who took notice of it. The matter to be accounted for, is how a point in the nave of a wheel comes to deſcribe, during one revolution, a line equal to the length of the outer circumference of the wheel, when a point in the outer circumference does no more.

Many great men having attempted in vain to account for this phænomenon, Mr. de Meyran, a French gentleman, had the good fortune to light on a ſolution of it, which the Academy of Sciences declared to be ſatisfactory. It is this: a wheel is only acted on, or drawn forward, in a right line: its circular motion, or rotation, ariſing purely from the reſiſtance of the ground whereon it is applied. Now this reſiſtance is equal to the force wherewith the wheel is drawn in the right line, inaſmuch as it defeats that direction, and, conſequently, the cauſes of the two motions being equal, their effects are equal too; or, a point in the wheel deſcribes, during one revolution, a right line on the ground equal to its outer circumference.

But as to the nave of the wheel, the caſe is otherwiſe; for though it is drawn in a right line by the ſame force as the outer circumference, yet it only turns round becauſe the wheel turns, and can only turn with it, and in the ſame time. Hence it follows, that its circular velocity is leſs than that of the circumference of the wheel, in the ratio of the two circumferences; and therefore of courſe, its circular motion is leſs than its rectilinear one. Since then it neceſſarily deſcribes a right line equal to that deſcribed by the circumference of the wheel, it can only do it by ſliding along.

ROTA is alſo the name of an eccleſiaſtical court at Rome, compoſed of twelve prelates, whereof one muſt be a German, another a Frenchman, and two Spaniards; the other eight are Italians, three of whom muſt be Romans, and the other five, a Bologneſe a Ferraran, a Milaneſe, a Venetian, and a Tuſcan.

This is one of the moſt auguſt tribunals in Rome, which takes cognizances of all ſuits in the territory of the church, by appeal; as alſo of all matters beneficiary and patrimonial.

ROTATED FLOWERS, among botaniſts, are ſuch flowers which ſpread open ſo as to form the ſhape of a wheel.

ROTATION, in geometry, a term chiefly applied to the circumvolution of any ſurface round a fixed and immoveable line, which is called the axis of its rotation: and by ſuch rotations it is, that ſolids are conceived to be generated. See the article GENESIS.

The late ingenious Mr. de Moivre ſhews how ſolids, thus generated, may be meaſured or cubed. His method is this: for the fluxion of ſuch ſolids, take the product of the fluxion of the abſciſs, multiplied by the circular baſe; and ſuppoſe the ratio of a ſquare to the circle inſcribed in it to be $\frac{n}{1}$: then the equation, expreſſing the nature of any circle, whoſe diameter is d, is $yy = dx - xx$. Therefore $\frac{4dx\dot{x} - x^2\dot{x}}{n}$ is the fluxion of a portion of the the ſphere; and, conſequently, the portion itſelf $4\frac{1}{2}dxx - x\frac{1}{3}x^3$, and the circumſcribed cylinder is $\frac{4dxx - x^3}{n}$; and, therefore, the portion of the ſphere is to the portion of the circumſcribed cylinder, as $\frac{1}{2}d - \frac{1}{3}x$ to $d - n$.

ROTATION, or REVOLUTION, in aſtronomy. See REVOLUTION.

ROTONDO, or ROTUNDO, in architecture, an appellation given to any building that is round both within and without ſide, whether it be a church, a ſalon, or the like.

The moſt celebrated rotondo of the ancients, is the pantheon at Rome. See PANTHEON.

ROTTENNESS, putrefaction. See the article PUTREFACTION.

ROUND, *Rotundus*, in geometry. See the articles CIRCLE, GLOBE, and SPHERE.

ROUND, in a military ſenſe, ſignifies a walk

which ſome officer, attended with a party of ſoldiers, takes in a fortified place around the ramparts, in the night-time, in order to ſee that the centries are watchful, and every thing in good order.

ROUNDELAY, a kind of ancient poem, thus termed, according to Menage, from its form, becauſe it turns back again to the firſt verſe, and thus goes round.

This poem is little known among us, but is very common among the French, who call it rondeau. It conſiſts commonly of thirteen verſes, eight whereof are in one rhyme, and five in another. It is divided into couplets, at the end of the ſecond and third whereof the beginning of the roundelay is repeated, and that, if poſſible, in an equivocal ſenſe.

ROUNDELET. See RUNDLET.

ROUT, a public road, highway, or courſe, eſpecially that which military forces take.

This word is alſo uſed for the defeat and flight of an army.

ROUT, in law, is applied to an aſſembly of perſons, going forcibly to commit ſome unlawful act, whether they execute it or not.

The difference between a rout and a riot ſeems to be this, that a rout is where perſons are unlawfully aſſembled, and have moved forwards, in order to commit the unlawful act intended, but part without doing it; whereas, riot is taken for the diſorderly fact, committed by any ſuch unlawful aſſembly. See RIOT.

ROWEL, among farriers, a kind of iſſue, made by drawing a ſkain of ſilk, thread, hair, or the like, through the nape of the neck, or other part, of a horſe; anſwering to what, in ſurgery, is called a ſeton. See the article SETON.

The rowelling of horſes is a method of cure frequently had recourſe to, in caſes of inward ſtrains, eſpecially about the ſhoulders or hips, as alſo for hard ſwellings not eaſy to be diſſolved.

The operation is this: a little ſlit being made through the ſkin, about a handbreadth below the part aggrieved, big enough to put a ſwan's quill in, the ſkin is raiſed from the fleſh, the end of the quill put in, and the ſkin blowed from the fleſh upwards, and all over the ſhoulder; then, the hole being ſtopped with the finger, the part blown is beat with a hazle-ſtick, and the wind ſpread with the hand all over, and then let go; this done, a ſkain of horſe-hair, or red ſarſenet, half the thickneſs of the little finger, is put in a rowelling-needle, ſeven or eight inches long, and the needle is put into the hole, and drawn through again, ſix or ſeven inches higher; then the needle is drawn out, and the two ends of the rowel tied together, anointing it every day, as well as before the putting it in, with ſweet butter and hog's greaſe, and drawing it backwards and forwards in the ſkin, to make the putrid matter diſcharge itſelf more plentifully.

Others, diſliking theſe rowels, as making too large a ſore and ſcar, uſe the French rowel, which is a round piece of ſtiff leather, with a hole in the midſt, laying it flat between the fleſh and ſkin, the hole in the rowel juſt againſt that in the ſkin, ſewing it with a needle and thread drawn through the hole and the ſkin, cleaning it once in two or three days, and then anointing it afreſh.

ROWELS *of a Spur*. See SPUR.

ROWS *of Trees*. See PARALLELISM.

ROYENA, in botany, a genus of plants whoſe flower is monopetalous, the tube is the length of the cup, and the limb is ſpreading, reflexed, and divided into five ovate ſegments; the ſtamina are ten very ſhort filaments, topped with oblong, acute, and twin antheræ. The fruit is an ovate, four-furrowed, and unilocular capſule, containing four oblong triangular nuts.

RUBIA, madder, in botany. See the article MADDER.

RUBICAN, in the manege. A horſe is ſaid to be of a rubican colour, when of a bay, ſorrel, or black, with a light grey or white upon the flanks, but ſo that this grey or white is not predominant there.

RUBIFYING, in chemiſtry, the act of turning a thing red by the force of fire, &c.

RUBIGALIA, in antiquity, a feaſt celebrated by the Romans, in honour of the god Rubigus, or the goddeſs Rubigo, to engage thoſe deities to preſerve the corn from blights and mildews.

The rubigalia were inſtituted by Numa, in the eleventh year of his reign, and were celebrated on the ſeventh of the calends of May.

RUBIGO, a diſeaſe incident to corn, commonly called mildew, being a ſpecies of blight. See the article BLIGHT.

RUBRIC, *Rubrica*, in the canon-law, ſignifies a title or article in certain antient law-books; thus called, becauſe written, as the titles of the chapters in our antient bibles are, in red letters.

Rubrics alſo denote the rules and directions given at the beginning, and in the courſe of, the liturgy, for the order and manner in which the ſeveral parts of the office are to be performed. There are general rubrics and ſpecial rubrics, a rubric for the communion, &c. In the Romiſh Miſſal and Breviary are rubrics for matins, for lauds, for tranſlations, beatifications, commemorations, &c.

RUBUS, the BRAMBLE, in botany, a genus of plants, whoſe flower cup is cut into five oblong patent ſegments, in which is inſerted five roundiſh erecto-patent petals of the ſame length; the filaments are numerous, inſerted in the calyx, and topped with roundiſh compreſſed antheræ; the fruit is a compound berry, formed of many roundiſh acini, arranged into a cluſter, convex at the top, and concave below, each acinus is unilocular, and contains

tains a ſingle oblong ſeed; the acini of moſt of the ſpecies coaleſe together, ſo as not to be ſeparated without breaking.

The common bramble or blackberry buſh, grows wild in woods, hedges, &c. in moſt parts of England, the root of which is ſlender, creeping, and knotty, from which ariſe ſeveral long, weak, bending, greeniſh-red, angular, pithy branches, armed with ſtrong crooked prickles; the leaves are oblong, pointed, dentated on the edges, rough, brown on the upper parts, but whitiſh below, placed by threes or fives on the ſame pedicle; the flowers come out on the extremities of the branches, in June, July, or Auguſt; and the fruit is ripe in autumn.

The root of this plant is cleanſing, aſtringent, and abſorbent; the leaves pounded and applied to ring-worms and ulcers of the legs, heal them in a ſhort time, and the fruit when ripe is cooling and quenches thirſt.

To this genus belong the raſpberry. See the article RASPBERRY.

RUBY, *Rubinus*, in natural hiſtory, a ſpecies of the *chroſtaſima* claſs of gems, being a beautiful gem of a red colour with an admixture of purple. See GEM.

This, in its moſt perfect and beſt coloured ſtate, is a gem of prodigious beauty and extreme value; it is often found perfectly pure and free from blemiſhes or foulneſs, but much more frequently debaſed greatly in its value by them, eſpecially in the larger ſpecimens. It is of very great hardneſs, equal to that of the ſapphire, and ſecond only to the diamond. It is various in ſize, but leſs ſubject to variations in its ſhape than moſt of the other gems. It is uſually found very ſmall, its moſt common ſize being equal to that of the head of the largeſt ſort of pins; but it is found of four, eight, or ten carats; and ſometimes, though very rare, up to twenty, thirty, or forty. It is never found of an angular or cryſtalliform ſhape, but always of a pebble-like figure, often roundiſh, ſometimes oblong and much larger at one end than the other, and in ſome ſort reſembling a pear, and is uſually flatted on one ſide. It commonly is naturally ſo bright and pure on the ſurface, as to need no poliſhing; and when its figure will admit of being ſet without cutting, it is often worn in its rough ſtate, and with no other than its native poliſh. Our jewellers are very nice, though not perfectly determinate, in their diſtinctions of this gem, knowing it in its different degrees of colour, under three different names: the firſt is ſimply the ruby, the name given it in its deepeſt coloured and moſt perfect ſtate: the ſecond is the ſpinel ruby; under this name they comprehend thoſe rubies which are of a ſomewhat leſs bright colour than the ruby ſimply ſo called: the third is the balaſs ruby; under this name they expreſs a pale yet a very bright ruby, with a leſs admixture of the purple tinge than in the deeper coloured one; this is of leſs value than the deeper one.

We have the true ruby only from the Eaſt-Indies; and the principal mines of it are in the kingdom of Pegu and the iſland of Ceylon. We have in Europe cryſtals tinged to the colour of the ruby, but they have nothing of its luſtre or hardneſs. The ruby ſeems to owe its colour to gold, it being poſſible to ſeparate a ſmall portion of gold from the little native rubies, and alſo to give the true colour of the ruby to fictitious paſte by means of that metal.

The way of preparing a metalline colour from gold and tin, for the tinging glaſs of a ruby colour is, according to Shaw as follows: Diſſolve gold in aqua-regia, and dilute the fine yellow ſolution with a large proportion of fair water; to the mixture add a ſufficient quantity of a ſaturated ſolution of tin, made alſo in aqua-regia, at ſeveral times, and a moſt beautiful red or purple-coloured powder will ſoon fall to the bottom of the containing glaſs: decant the liquor and dry the powder, a few grains whereof being melted along with white cryſtalline glaſs will tinge it throughout of an extremely fine purple or ruby colour.

In M. Savary's Dict. de Commerce, we have the following table of the value of rubies, from one carat, or four grains, to ten carats:

	l.	s.	d.
A ruby of one carat is worth - - -	1	15	00
Of two - - - - - - - - -	9	00	00
Of three - - - - - - - -	22	10	00
Of four - - - - - - - -	33	15	00
Of five - - - - - - - -	45	00	00
Of ſix - - - - - - - -	67	10	00
Of ſeven - - - - - - - -	84	00	00
Of eight - - - - - - - -	106	00	00
Of nine - - - - - - - -	150	00	00
Of ten - - - - - - - -	216	00	00

RUBY, in heraldry, denotes the red colour wherewith the arms of noblemen are blazoned; being the ſame which in the arms of others, not noble, is called gules. See the article GULES.

RUCTATION, BELCHING, a ventoſity ariſing from indigeſtion, and diſcharging itſelf at the mouth with a very diſagreeable noiſe. There are belches owing to repletion, and others to inanition, or emptineſs. Quincy ſays hypochondriac and hyſteric perſons are particularly liable to this diſorder. They are rather to be cured with proper ſtomachics than carminitives and hot liquors.

RUDBECKIA, DWARF SUN-FLOWER, in botany, a genus of plants, whoſe flower is compound and radiated, conſiſting of hermaphrodite, and female corollulæ; the hermaphrodite, which are tubulous and funnel-ſhaped, compoſe the diſc in a conic form: the female corollulæ, which form the rays, are ligulated, and end in two or three indentures. There is no pericarpium, but the cup contains

tains, ſolitary, oblong, ſeeds, crowned with a membranaceous down, and fixed to a conic, paleaceous receptacle.

RUDDER, in navigation, a piece of timber turning on hinges in the ſtern of the ſhip, and which, oppoſing ſometimes one ſide to the water and ſometimes another, turns or directs the veſſel this way or that. See SHIP.

The rudder of a ſhip is a piece of timber hung on the ſtern-poſts by four or five iron-hooks, called pintles, ſerving as it were for the bridle of a ſhip to turn her about at the pleaſure of the ſteers-man. The rudder being perpendicular; and without-ſide the ſhip, another piece of timber is fitted to it at right angles, which comes into the ſhip, by which the rudder is managed and directed. This latter properly is called the helm or tiller; and ſometimes, though improperly, the rudder itſelf. The power of the rudder is reduceable to that of the lever. See the article LEVER.

As to the angle the rudder ſhould make with the keel, it is ſhewn, that in the working of ſhips, in order to ſtay or bear up the ſooneſt poſſible, the tiller of the rudder ought to make an angle of 55° with the keel. A narrow rudder is beſt for a ſhip's ſailing, provided ſhe can feel it; that is, be guided and turned by it: for a broad rudder will hold much water when the helm is put over to any ſide; but if a ſhip have a fat quarter, ſo that the water cannot come quick and ſtrong to her rudder, ſhe will require a broad rudder. The aft-moſt part of the rudder is called the rake of the rudder.

RUDENTURE, in architecture, the figure of a rope or ſtaff, ſometimes plain, ſometimes carved, with which the third part of the flutings of columns are frequently filled up.

RUDIMENTS, *Rudimenta*, the firſt principles or grounds of any art or ſcience, called alſo the elements thereof. See the article ELEMENT.

RUE, *Ruta*, in botany. See the article RUTA.

RUELLIA, in botany, a genus of plants, whoſe flower is monopetalous and irregular; the tube is the length of the cup, with a patulous inclined neck; the limb ſpreads open, and is divided into five ſegments; the two upper ones are large and reflexed; the ſtamina are four filaments, placed in the ſpreading part of the tube, connected in pairs, and terminated with ſhort antheræ. The fruit is a taper capſule pointed at each end, and containing two cells; which incloſe a few roundiſh compreſſed ſeeds.

RULE, *Regula*, in matters of literature, a maxim, canon or precept, to be obſerved in any art or ſciences.

The rules of philoſophizing, of reaſoning, of method, as alſo thoſe to be obſerved in logic, morality, poetry, medicine, rhetoric, &c. have been already delivered under the articles PHILOSOPHIZING, REASONING, &c.

RULE, in arithmetic, denotes an operation performed with figures, in order to diſcover ſums or numbers unknown.

The fundamental rules are addition, ſubtraction, multiplication, and diviſion. See ADDITION, &c.

But beſides theſe, there are other rules denominated from their uſe; as the rule of allegation, fellowſhip, intereſt, practice, reduction, &c. See the article ALLIGATION, &c.

RULE OF THREE, GOLDEN RULE, or RULE OF PROPORTION, is one of the moſt eſſential rules of arithmetic; for the foundation of which ſee the articles GEOMETRICAL PROPORTION.

It is called the Rule of Three from having three numbers given to find a fourth, but more properly the Rule of Proportion, becauſe by it we find a fourth number proportional to three given numbers: and becauſe of the neceſſary and extenſive uſe of it, it is called the Golden Rule. But to give a definition of it with regard to numbers of particular and determinate things, it is the rule by which we find a number of any kind of things, as money, weight, &c. ſo proportional to a given number of the ſame things, as another number of the ſame or different things, is to a third number of the laſt kind of thing. For the four numbers that are proportional muſt either be all applied to one kind of things; or two of them muſt be of one kind, and the remaining two of another: becauſe there can be no proportion, and conſequently no compariſon of quantities of different ſpecies, as for example, of three ſhillings and four days; or of ſix men and four yards.

All queſtions that fall under this rule may be diſtinguiſhed into two kinds: the firſt contains theſe wherein it is ſimply and directly propoſed to find a fourth proportional to three given numbers taken in a certain order: as if it were propoſed to find a ſum of money ſo proportioned to one hundred pounds as ſixty four pounds ten ſhillings is to eighteen pounds ſix ſhillings and eight pence, or as forty pounds eight ounces is to ſix hundred weight. The ſecond kind contains all ſuch queſtions wherein we are left to diſcover, from the nature and circumſtances of the queſtion, that a fourth proportional is ſought; and, conſequently, how the ſtate of the proportion or compariſon of the term, is to be made; which depends upon a clear underſtanding of the nature of the queſtion and proportion. After the given terms are duly ordered, what remains to be done is to find a fourth proportional. But to remove all difficulty at much as poſſible, the whole ſolution is reduced to the following general rule, which contains what is neceſſary for ſolving ſuch queſtions wherein the ſtate of the proportion is given; in order to which it is neceſſary to premiſe theſe obſervations.

1. In all queſtions that fall under the following rule there is a ſuppoſition and a demand: two of the

the given numbers contain a ſuppoſition upon the conditions whereof a demand is made, to which the other given term belongs: and it is therefore ſaid to raiſe the queſtion; becauſe the number ſought has ſuch a connection with it, as one of theſe in the ſuppoſition has to the other. For example; if 3 yards of cloth coſt 4 l. 10 s. (here is the ſuppoſition) what are ſeven yards 3 quarters worth? here is the demand or queſtion raiſed upon 7 yards 5 quarters, and the former ſuppoſition.

2. In the queſtion there will ſometimes be a ſuperfluous term; that is, a term which, though it makes a circumſtance in the queſtion, yet it is not concerned in the proportion, becauſe it is equally ſo in both the ſuppoſition and demand. This ſuperfluous term is always known by being twice mentioned, either directly, or by ſome word that refers to it. Example, if 3 men ſpend 20 l. in 10 days, how much, at that rate, will they ſpend in 25 days? Here the three men is a ſuperfluous term, the proportion being among the other three given terms, with the number ſought; ſo that any number of men may be as well ſuppoſed as 3.

Rule. Firſt, the ſuperfluous term (if there is one) being caſt out, ſtate the other three terms thus: of the two terms in the ſuppoſition, one is like the thing ſought (that is, of the ſame kind of thing the ſame way applied); ſet that one in the ſecond or middle place; the other term of the ſuppoſition ſet in the firſt place or on the left hand of the middle: and the term that raiſes the queſtion, or with which the anſwer is connected, ſet in the third place, or on the right hand; and thus the extremes are like one another, and the middle term like the thing ſought: alſo the firſt and ſecond terms contain the ſuppoſition, and the third raiſes the queſtion; ſo that the third and fourth have the ſame dependance or connection as the firſt and ſecond. This done,

Secondly, Make all the three terms ſimple numbers of the loweſt denominations expreſſed, ſo that the extremes be of one name. Then,

Thirdly, repeat the queſtions from the numbers thus ſtated and reduced, (arguing from the ſuppoſition to the demand) and obſerve whether the number ſought ought to be greater or leſſer than the middle term, which the nature of the queſtion, rightly conceived, will determine; and accordingly, multiply the middle term by the greater or leſſer extreme, and divide the product with the other, the quote is like the middle term, and is the complete anſwer, if there is no remainder; but if there is, then,

Fourthly, Reduce the remainder to the denomination next below that of the middle term, and divide by the ſame diviſor, the quotient is another part of the anſwer in this new denomination. And if there is here alſo a remainder, reduce it to the next denomination, and then divide. Go on thus to the loweſt denomination, where, if there is a remainder, it muſt be applied fraction-wiſe to the diviſor; and thus you will have the complete anſwer in a ſimple or mixed number.

Note, if any of the dividends is leſs than the diviſor, reduce it to the next denomination, and to the next again, till it be greater than, or equal to, the diviſor.

EXAMPLES.

Queſtion I. If 3 yards of cloth coſt 8 s. what is the price of 15 yards? Anſwer, 40 s. or 2 l.

Work.

yds. s. yds.
3—8—15
15
3|120|40 s.

Explanation: 3 yards and 8 s. contain the ſuppoſition, and 8 s. is like the thing ſought; therefore, 8 s. is the middle term, and yards on the left: then the demand ariſes upon 15 yards, and therefore it is on the right. Again, from the nature of the queſtion, it is plain, that 15 yards require more than 3 yards, i. e. the anſwer muſt be greater than the middle term; wherefore, 8 s. is to be multiplied by 15 yards; the product is 120 s. which, divided by 3 yards, quotes 40 s. without a remainder; ſo 40 s. or 2 l. is the number ſought.

Queſt. II. If 4 lb. of ſugar coſt 2 s. 9 d. what is the value of 18 lb? Anſwer, 12 s. 4½ d.

Work.

lb. s. d. lb.
4—2 9—18
12
33 d.
18
264
33
4|94|148 d.
2
4
4|8|2 farthings.

Expl. The ſuppoſition is in 4 lb. and 2 s. 9 d. this laſt term being like the thing ſought, which is connected with 18 lb. wherefore the terms are ſtated according to the rule: then the middle term being mixed, it is to be reduced to pence, and then argue thus: If 4 lb. coſt 33 d. 18 lb. muſt coſt more; therefore, multiply 33 d. by 18 lb. and divide their product by 4; the quotient is 148 d. and 2 remains, which is to be reduced to farthings, and the product divided by the former quotient, gives 2; ſo the anſwer is 148 d. 2 farthings, or 12 s. 4½ d. becauſe 148 d. is, by reduction, 12 s. 4 d.

Queſt. III. What is the price of 50 lb. of tobacco, when 32 lb. 12 oz. coſt 4 l. 10 s? Anſw. 6 l. 17 s. 4¾ d.

Work.

lb. oz. l. s. lb. oz. s. oz.
32 12—4 10—50 524—90—800
16 20 16 800
194 90 300 524|72090|137 s.
33 50 524
524 800 1960
1572
3880
3668
Remainder 212
12
524|2544|4 d.

2096
Remainder 448
4
524|1792|3 220/524 q.
1572
220

Queſt. IV. What are 5 yards of ribband worth, whereof 63 yards 2 quarters coſt 5 *l.*? Anſw. 7 *s.* 10 *d.* 1 2/4 3/4 *q.*

Work.

yds. qrs. l. yds.
63 2—5— 5
4 4
254 *qrs.*—5—20 *qrs.*
20
100
20
254|2000|7 *s.*
1778
Rem. 222
12
254|2664|10 *d.*
254
124
4
254|496|1 2/4 3/4 *q.*
254
242

Explanation: The terms ſtated, and reduced according to the rule, I find the anſwer ought to be leſs than the middle term; therefore, I multiply 5 *l.* by 20 quarters, but the product is leſs than the diviſor; and ſo it is to be reduced to ſhillings, which makes 2000 *s.* this divided by 254, quotes 7 *s.* The reſt of the work is plain.

Queſt. V. What time will 7 men be boarded for 25 *l.* when 3 men paid 25 *l.* for 6 months? Anſw. 2 months 16 days, reckoning 28 days to 1 month.

Work.

men. mths. men.
3——6——7
3
7|18|2 months.
14
Rem. 4
28
7|112|16 days.

Explanation. The 25 l. is a ſuperfluous number; then the ſuppoſition is in the 3 men and 6 months, and the demand regards the 7 men: the terms being all ſimple, you are to argue thus; if 3 men are boarded 6 months for 25 l. (or any ſum), 7 men will be boarded for the ſame a ſhorter time: therefore multiply 6 months by 3, and divide the product 18 by 7, whereby the anſwer is found to be 2 months and 16 days.

Note. The firſt four queſtions are what is called the rule of three direct, that is, where the third term being greater or leſs than the firſt, requires that the anſwer be greater or leſs than the ſecond term. The two laſt queſtions are of the rule of three indirect, or reverſe: where the third term being greater or leſs that the firſt, requires the fourth contrarily leſs or greater than the ſecond. But we have comprehended both in one general rule. And from this obſervation may be learned what queſtions are of either kind.

RULE, in a monaſtic ſenſe, a ſyſtem of laws or regulations, whereby religious houſes are governed, and which the religious make a vow, at their entrance, to obſerve. Such are the rules of the Auguſtins, Benedictins, Carthuſians, Franciſcans, &c. See AUGUSTINS, &c.

RULES *of Court*, in law, are certain orders made from time to time, in the courts of law, which attornies are bound to obſerve, in order to avoid confuſion; and both the plaintiff and defendant are at their peril alſo bound to pay obedience to rules made in court relating to the cauſe depending between them.

RULE, or RULER, an inſtrument of wood or metal, with ſeveral lines delineated on it, of great uſe in practical menſuration.

When a ruler has the lines of chords, tangents, ſines, &c. it is called a plane ſcale. See the article SCALE.

RUM, a ſpecies of brandy, or vinous ſpirit, diſtilled from ſugar canes. See BRANDY, DISTILLATION, and SPIRIT

Rum, according to Dr. Shaw, differs from ſimple ſugar-ſpirit, in that it contains more of the natural flavour or eſſential oil of the ſugar-cane; a great deal of raw juice and parts of the cane itſelf being often fermented in the liquor, or ſolution, of which the rum is prepared.

The unctuous or oily flavour of rum is often ſuppoſed to proceed from the large quantity of fat uſed in boiling the ſugar; which fat indeed if coarſe, will uſually give a ſtinking flavour to the ſpirit, in our diſtillations of the ſugar-liquor, or waſh, from our refining ſugar houſes; but this is nothing of kin to the flavour of the rum, which is really the effect of the natural flavour of the cane.

The method of making rum is this: When a ſufficient ſtock of the materials is got together, they add water to them, and ferment them in the common method, though the fermentation is always carried on very ſlowly at firſt; becauſe at the beginning of the ſeaſon for making rum in the iſlands, they want yeaſt or ſome other ferment to make it work; but by degrees, after this they procure a ſufficient quantity of the ferment, which riſes up as a head to the liquor in the operation, and thus they are able afterwards to ferment and make their rum with a great deal of expedition, and in large quantities.

When the waſh is fully fermented, or to a due degree of acidity, the diſtillation is carried on in the common way, and the ſpirit is made up proof: though ſometimes it is reduced to a much greater ſtrength nearly approaching to that of the alcohol or ſpirit of wine, and it is then called double diſtilled rum. It might be eaſy to rectify the ſpirit, and bring

bring it to a much greater purity than we uſually find it to be of; for it brings over in the diſtillation a very large quantity of the oil; and this is often ſo diſagreeable that the rum muſt be ſuffered to lie by a long time to mellow before it can be uſed; whereas, if well rectified, it would grow mellow much ſooner, and would have a much leſs potent flavour.

The beſt ſtate to keep rum in, both for exportation and other uſes, is doubtleſs that of alcohol, or rectified ſpirit. In this manner it would be tranſported in one half the bulk it uſually is, and might be let down to the common proof-ſtrength with water when neceſſary: for the common uſe of making punch, it would likewiſe ſerve much better in the ſtate of alcohol; as the taſte would be cleaner; and the ſtrength might always be regulated to a much greater exactneſs than in the ordinary way.

The only uſe to which it would not ſo well ſerve in this ſtate, would be the common practice of adulteration among our diſtillers; for when they want to mix a large portion of cheaper ſpirit with the rum, their buſineſs is to have it of the proof ſtrength, and as full of the flavouring oil as they can, that it may drown the flavour of the ſpirits they mix with it, and extend its own. If the buſineſs of rectifying rum was more nicely managed, it ſeems a very practicable ſcheme to throw out ſo much of the oil, as to have it in the fine light ſtate of a clear ſpirit, but lightly impregnated with it; in this caſe it would nearly reſemble arrac, as is proved by the mixing a very ſmall quantity of it with a taſteleſs ſpirit, in which caſe the whole bears a very near remſemblance to arrac in flavour.

Rum is uſually very much adulterated in England; ſome are ſo barefaced as to do it with malt-ſpirit; but when it is done with molaſſes-ſpirit, the taſtes of both are ſo nearly allied that it is not eaſily diſcovered. The beſt method of judging of it is, by ſetting fire to a little of it; and when it has burnt away all the inflammable part examining the phlegm both by the taſte and ſmell.

RUMEN, in comparative anatomy, the paunch, or firſt ſtomach of ſuch animals as chew the cud, thence called ruminant animals.

The rumen is by far the largeſt of all the ſtomachs, and in it the whole maſs of crude aliments, both ſolid and liquid, lies and macerates, to be thence tranſmitted to the mouth to be again chewed, comminuted, and fitted for farther digeſtion in the other ventricles. See the article DIGESTION.

RUMEX, the DOCK, in botany, a genus of plants whoſe flowers conſiſt of three ovate connivent petals, with ſix very ſhort capillary filaments topped with erect twin antheræ: there is no pericarpium, but the ſeed which is ſingle and three-cornered, is included in the corolla.

This genus includes the lapathum and acetoſa of Tournefort. See the articles LAPATHUM and ACETOSA.

RUMMAGE, in the ſea language, ſignifies to clear a ſhip's hold or to remove goods from one place of it to another.

RUMPFIA, in botany, a genus of plants whoſe flower conſiſts of a monaphyllous, trifid cup, containing three oblong, obtuſe and equal petals, with three ſubulated filaments, topped with ſmall antheræ. The fruit is a coriaceous turbinated drupe, having three furrows, and contains an ovate trilocular nut, with a ſingle three cornered kernel in each cell.

RUN, in the ſea language, denotes ſo much of a ſhip's hull, as is under water.

RUNDLE, or ROUNDLE, in heraldry, the ſame with pellet.

RUNDLET, or RUNLET, a ſmall veſſel, containing an uncertain quantity of any liquor, from three to twenty gallons.

RUNIC, a term applied to the language and letters of the antient Goths, Danes, and other Northern nations.

RUNNER, in the ſea language, a rope belonging to the garnet, and to the two bolt-tackles. It is reeved in a ſingle block, joined to the end of a pennant, and has, at one end, a hook to hitch into any thing, and at the other end a double block, into which is reeved the fall of the tackle, or the garnet, by which means it purchaſes more than the tackle would without it.

RUNNET, or RENNET, the acid juice found in the ſtomach of calves, that have fed on nothing but milk, and are killed before the digeſtion is perfect.

RUNNING *of Goods*, a clandeſtine landing of goods, without paying the legal cuſtoms or duties for the ſame.

RUPEE, ROUPIA, or ROUPIAS, names of a gold and ſilver coin, current in the Eaſt-Indies.

RUPPIA, in botany, a genus of plants whoſe flower is without a corolla: the cup is an awl-ſhaped ſpadix; and the ſtamina conſiſts of four ſeſſile, roundiſh, erect, half-twin antheræ. There is no pericarpium; but the ſeeds, which are four or five in number, are ovate and oblique, are terminated by a plain ſtigmata.

RUPTURE, in ſurgery, the ſame with hernia. See the article HERNIA.

RUPTURE-WORT, *Herniaria*, in botany. See the article HERNIARIA.

RURAL, or RUSTIC, in general, denotes ſomething that relates to the country.

RURAL DEAN, in church-hiſtory. See the article DEAN.

RUSCUS, knee-holly, or butcher's-broom, in botany, a genus producing male and female flowers on diſtinct plants: the flower cup is divided into ſix ovate convex ſegments; the petals are wanting; but each have an oval, erect, inflated nectarium opening at its mouth. in the male flower, are

are placed on the top of the nectarium and joined at their base, three spreading antheræ. The female flower contains an oblong oval germen supporting a cylindraceous style, which is crowned with an obtuse stigma standing above the mouth of the nectarium; the fruit is a globose, trilocular berry, containing two round seeds.

There are several species of ruscus; the common sort which grows wild in the woods, in many parts of England, is of an austere and bitterish taste, and accounted aperient and detersive.

Boerhaave, affirms, the decoction of the leaves in white wine, is an excellent remedy in the gravel and dropsy: the root is one of the five great opening roots.

RUSH, *juncus*, in botany, a genus of plants, whose flower hath no corolla: but the perianthium, when fresh and coloured, much resembles one: the stamina are six very short capillary filaments topped with oblong erect antheræ. The fruit is a close, triqueous capsule with one cell, and opening with three valves, and contains several roundish seeds.

There are several species of rush growing in England in moist places; also on the sea shore, particularly in Holland, where they are planted with great care, in order to prevent the water from washing away the earth, which being very loose, would be in danger of removing every tide, if it were not for the roots of these rushes, which fasten themselves very deep in the ground, and mat near the surface, so as to hold the earth closely together. Therefore, whenever the roots of these rushes are destroyed, they are immediately repaired to prevent farther damage. In the summer time, when the rushes are fully grown, the inhabitants cut them and tie them up in bundles, which are dried, and afterwards carried into the larger towns and cities, where they are wrought into baskets, and several other useful things, which are frequently sent into England.

Sweet-RUSH. See ACORNS.

RUST *of a Metal*, the flower or calx thereof, procured by coroding and dissolving its superficial parts by some menstruum. Water is the great instrument or agent in producing rust; and hence oils, and other fatty bodies, secure metals from rust; water being no menstruum to oil, &c. and therefore not able to make its way through it.

All metals are liable to rust, even gold itself, if exposed to the fumes of sea salt.

RUST, or BLIGHT *of Corn*. See BLIGHT.

RUSTIC, in architecture, implies a manner of building in imitation of nature, rather than according to the rules of art.

RUSTIC-WORK, is where the stones in the face, &c. of a building, instead of being smooth, are hatched, or picked with a point of a hammer.

RUSTIC-ORDER, that decorated with rustic quoins, rustic work, &c.

RUSTRE, in heraldry, a bearing of a diamond-shape, pierced through in the middle with a round hole.

RUT, in hunting, the venery or copulation of deer.

RUTA, rue, in botany, a genus of plants whose flower consists of five patent oval petals, with narrow ungues; the stamina are ten subulated spreading filaments, topped with erect and short antheræ. the fruit is a gibbous capsule, with five lobes and five cells opening in five parts at the top, and contains many rough angulated seeds.

The common garden rue may be propagated either by slips or cuttings in the spring, or from seeds; it has a disagreeable smell, with an acrid bitter taste; the leaves, when in perfection, will blister the skin if much handled; and are said to be inciding, attenuant, and discussive.

It is commended as an alexipharmic and cephalic, and prescribed in hysterics and nervous complaints. Rue is replete with a fat viscous juice, and therefore yields little to any good purpose in distillation, unless when first digested in a spirituous menstruum. The best way of taking it, is the leaves fresh gathered, for those who can bear the taste; or they may be taken in powder from a scruple to a dram, or the infusion may be drank as tea.

Goats-RUE, *Galega*, in botany, a plant producing papilionaceous flowers; the root is slender, woody, white, fibrous, and perennial; the stalks arise two or three feet high, and are hollow, streaked, and divided into several branches; the leaves are winged, and composed of six or seven pair of lobes, terminated by an odd one. The flowers grow in spikes at the ends of the stalks, and are of a pale blue colour; they appear in June, and are succeeded by taper pods about an inch and a half long, and contain in each a row of kidney-shaped seeds.

This plant is used in medicine, and is accounted cordial, sudorific, and alexipharmic, and has been commended in pestilential fevers; it may be eaten either crude or boiled, or a spoonful of the juice may be given for a dose.

Meadow RUE, *Thalictrum*. See the article THALICTRUM.

Wall-RUE, *Ruta Muraria*, a species of asplenium. See ASPLENIUM.

Wild-RUE, *Harmala*, or *Peganum*. See the article PEGANUM.

RYE, *Secale*, in botany, a gramineous plant, whose root is furnished with slender fibres, and from which arises several stalks, having four or five knots with a few long narrow leaves, that are reddish when they spring out of the ground; the flower-corolla consists of two valves; the exterior valve

is

is rigid, ventricoſe, acuminated, and compreſſed; its lower edge is ciliated, and terminating in a long ariſta; the interior valve is lanceolated and plain; the nectaria are two, ovated and erect; the filaments are three, hairy, and hanging without the flower; theſe are terminated by oblong forked antheræ; the corolla ſerves the office of a pericarpium, incloſing the ſeed, and at a proper time opening and dropping it out; the ſeed is ſingle, oblong, and almoſt cylindric. The ſpikes, or ears, of rye are longer and flatter than thoſe of wheat, and flowers in May. The farmers diſtinguiſh two ſorts of this plant, by the titles of winter and ſpring rye; but it is the winter ſort which is principally propagated; it is uſually ſown about the beginning of September, on ſuch poor land as wheat will not thrive on, and in dry weather, if poſſible; two buſhels of ſeed is generally allowed to an acre; but if the ground be newly broke up, or ſubject to worms, then a peck more is commonly allowed; a little ſprinkling of dung or mud upon rye-land will greatly advance the crop, though it is laid but half the thickneſs that it is for other corn: its produce is commonly about twenty buſhels upon an acre.

The general uſe of rye is for bread, either alone or mixed with wheat; but is only fit for thoſe perſons who have always been uſed to it.

Rye is reckoned more detergent than any other grain of which bread is made. It is by ſome uſed in ſuppurative aud diſcutient cataplaſms, and not always without ſucceſs to the parts affected with the gout.

RYE-GRASS, a ſpecies of hordeum. See HORDEUM. It is common to mix clover and rye graſs together, allowing ten pounds of clover and one buſhel of rye-graſs to an acre; but this is only to be done where the land is deſigned to remain but three or four years in paſture, as neither the rye-graſs or clover are of long duration; and it certainly is a wrong, though too general practice, to ſow rye-graſs with barley, for the corn muſt conſiderably draw away the nouriſhment from the graſs, ſo as to leave but half a crop of graſs when the barley is off the ground.

RYME, or RHYME. See RHYME.

RYSAGON, a name given to the caſſumunar-root. See CASSUMUNAR.

S.

S, The eighteenth letter, and fourteenth conſonant of our alphabet; the ſound of which varies, being ſtrong in ſome words, as *this*, *thus*, &c. and ſoft in words which have a final *e*, as *muſe*, *wiſe*, &c. It is generally doubled at the end of words, whereby they become hard and harſh, as in *kiſs*, *laſs*, &c. In ſome words it is ſilent, as *iſle*, *iſland*, *viſcount*, &c. In writing, or printing, the long character *ſ*, is uſed at the beginning and middle of words, but the ſhort *s*, at the end.

In abbreviations, S. ſtands for *ſocietas*, or *ſocius*, as, R.S.S. for *regiæ ſocietatis ſocius*, i. e. fellow of the royal ſociety. In medicinal preſcriptions, S.A. ſignifies *ſecundum artem*, i. e. according to the rules of art. Uſed as a numeral, S, anciently denoted ſeven.

SABÆANS, in church hiſtory, a ſet of idolators, much more ancient than the Jewiſh law.

In the early ages of the world, idolatry was divided between two ſects; the worſhippers of images, called Sabæans, or Sabians, and the worſhippers of fire, called Magi. See MAGI.

The Sabæans began with worſhipping the heavenly bodies, which they imagined were animated by inferior deities. In the conſecration of their images, they uſed many incantations to draw down into them from the ſtars, thoſe intelligences for whom they erected them, whoſe power and influence, they held, afterwards dwelt in them.

This religion, it is ſaid, firſt began among the Chaldæans, with their knowledge in aſtronomy; and from this it was, that Abraham ſeparated himſelf, when he came out of Chaldæa. From the Chaldæans it ſpread all over the Eaſt; and from thence to the Grecians, who propagated it to all the nations of the known world.

The remainder of this ſect ſtill ſubſiſts in the Eaſt, and pretend to derive their name from Sabius, a ſon of Seth; and among the books in which the doctrines of this ſect are contained, they have one which they call the Book of Seth, and which, they pretend, was written by that patriarch.

SABBATH, or the day of reſt, a ſolemn feſtival of the Jews, on the ſeventh day of the week, or Saturday, beginning from ſun-ſet on Friday, to ſun-ſet on Saturday.

The obſervation of the ſabbath began with the world; for God, having employed ſix days in its creation, appointed the ſeventh as a day of reſt, to be obſerved by man, in commemoration of that great event.

On this day, the Jews were commanded to abſtain from all labour, and to give reſt to their cattle. They were not allowed to go out of the city farther than two thouſand cubits, or about a mile; a cuſtom which was founded on the diſtance of the ark from the tents of the Iſraelites, in the wilderneſs, after their leaving Egypt; for being permitted to go, even on the ſabbath-day, to the tabernacle to pray, they from thence inferred, that the taking a journey of no greater length, though on a different account could not be a breach of the ſabbatical reſt.

As the ſeventh day was a day of reſt to the people, ſo was the ſeventh year to the land; it being unlawful in this year to plow or ſow, and whatever the earth produced, belonged to the poor; this was called the ſabbatical year.

The modern, as well as the antient, Jews, are very ſuperſtitious in the obſervance of the ſabbath; they carry neither arms, nor gold, nor ſilver about them, and are permitted neither to touch theſe, nor a candle, nor any thing belonging to the fire; on which account they light up lamps on Friday, which burn till the end of the ſabbath.

There is at preſent a ſect of baptiſts called ſabbatarians, from their obſerving the ſeventh day of the week, as a day ſet apart for the worſhip of God; they

they attempt to juſtify this practice by alledging that the Jewiſh ſabbath was never abrogated in the New Teſtament; and that where God has given a command, it is our duty to obſerve it till he has abrogated or altered it by a new command. See the article SUNDAY.

SABELLIANS, a ſect of chriſtians of the IIId century, that embraced the opinions of Sabellius, a philoſopher of Egypt, who openly taught that there is but one perſon in the Godhead.

The Sabellians maintained, that the Word and the Holy Spirit are only virtues, emanations, or functions of the Deity; and held that he who is in heaven is the father of all things, deſcended into the virgin, became a child, and was born of her as a ſon; and that having accompliſhed the myſtery of our ſalvation, he diffuſed himſelf on the apoſtles in tongues of fire, and was then denominated the Holy-Ghoſt. This they explained by reſembling God to the ſun, the illuminative virtue or quality of which was the Word, and its warming virtue the Holy Spirit. The Word, they taught, was darted, like a divine ray, to accompliſh the work of redemption; and that being reaſcended to heaven, the influences of the Father were communicated after a like manner to the apoſtles.

SABLE, in heraldry, denotes the colour black, in coats of arms belonging to gentlemen; but in thoſe of noblemen it is called diamond; and in thoſe of ſovereign princes, ſaturn.

It is expreſſed in engraving, by perpendicular and horizontal hatches croſſing one another.

SABRE, a kind of ſword, or ſcimiter, with a very broad and heavy blade, thick at the back, and a little falcated or crooked towards the point.

It is the ordinary weapon worn by the Turks, who are ſaid to be very expert in the uſe of it.

SAC, in law, is ſaid to be an ancient privilege, which the lord of a manor claims of holding his court, in cauſes of treſpaſs among his tenants, and impoſing fines for the ſame.

SACCHARUM-SATURNI, ſugar of lead, for the preparation of which, ſee SUGAR *of Lead.*

Some have ventured to give ſugar of lead internally, in doſes of a few grains, as a ſtyptic, in hæmorrhages, profuſe colliquative ſweats, ſeminal fluxes, the fluor albus, &c. and, indeed, it muſt be allowed, that it very powerfully reſtrains the diſcharge; but then it occaſions other ſymptoms, often dangerous, and ſometimes fatal, as violent colic pains, obſtinate conſtipations, cramps, tremors, &c. ſo that its internal uſe ſeems by no means innocent.

SACCO BENITO. See INQUISITION and ACT *of faith.*

SACCULUS, in anatomy, a diminutive of ſaccus, ſignifies a little bag: as, 1. The ſacculus lacrymalis, which is a little bag, into which the puncta lacrymalia of the eye open. 2. The ſacculus cordis, or pericardium. 3. The ſacculus chyliferus, the beginning of the thoracic duct, more uſually called receptaculum chyli. 4. Sacculi adipoſi, or the adipoſe cells, &c. See the article EYE, PERICARDIUM, RECEPTACULUM, &c.

A topical application, incloſed in a linen bag, is alſo termed ſacculus medicinalis; as is a bag filled with medicinal ſimples, and ſuſpended in a liquor, in order to make a diet-drink.

SACCUS JUGULARIS, the jugular-ſack, in anatomy, a receptacle formed atthe termination of the internal jugular vein; the uſe of which is to bring back the blood from the ſinuſes of the dura mater, and from the brain. See the article JUGULAR and BRAIN.

SACERDOTAL, ſomething belonging to prieſts. See the article PRIEST.

SACK *of wool*, a quantity of wool containing juſt twenty-two ſtone, and every ſtone fourteen pounds. In Scotland, a ſack is twenty-four ſtone, each ſtone containing ſixteen pounds.

SACK *of Cotton-wool*, a quantity from one hundred and a half to four hundred weight.

SACKS *of Earth*, in fortification, are canvas bags filled with earth. They are uſed in making retrenchments in haſte, to place on parapets, or the head of the breaches, or to repair them, when beaten down.

SACKBUT, a muſical inſtrument of the wind-kind, being a ſort of trumpet, though different from the common trumpet, both in form and ſize: it is fit to play a baſs, and is contrived to be drawn out, or ſhortened, according to the tone required, whether grave or acute. The Italians call it trombone, and the Latins tuba ductilis.

It takes aſunder in four pieces, and has frequently a wreath in the middle, which is the ſame tube only twice twiſted, or making two circles in the middle of the inſtrument, by which means it is brought down one fourth lower than its natural tone; it has alſo two pieces of branches on the inſide, which do not appear, unleſs drawn out by an iron-bar, and which lengthens it till it hit the tone required.

The ſackbut is uſually eight feet long, without reckoning the circles, and without being drawn out: when it is extended to its full length, it is uſually fifteen feet; the wreath is two feet nine inches in circumference.

There are ſackbuts of different ſizes, diſtinguiſhed by the epithets primo or I°, ſecundo or II°, terzo or III°, &c. or 1°, 2°, 3°, &c.

SACRA, the SACRED ARTERY, in anatomy, is a branch of the aorta deſcendens; which, according to Heiſter, ſometimes deſcends through the os ſacrum to the pelvis; ſometimes ariſes one from each illiac, and ſometimes is altogether wanting.

There is alſo a vein called the vena ſacra, which ariſes from the vena cava, juſt above the illiacs: it is ſometimes double.

SACRAMENT, *Sacramentum*, ſignifies, in general, a ſign of a thing ſacred and holy; and is defined to be an outward and viſible ſign of a ſpiritual

grace. Thus there are two objects in a ſacrament, the one the object of the ſenſes, and the other the object of faith. Proteſtants admit only of two ſacraments, baptiſm, and the euchariſt, or Lord's ſupper: but the Roman-catholics own ſeven, viz. baptiſm, confirmation, the euchariſt, penance, extreme unction, ordination, and marriage. See the articles BAPTISM, CONFIRMATION, &c.

The romaniſts, however, by way of eminence, call the euchariſt the holy ſacrament. Thus to expoſe the holy ſacrament, is to lay the conſecrated hoſt on the altar to be adored. The proceſſion of the holy ſacrament, is that in which this hoſt is carried about the church, or about a town.

SACRAMENT was alſo uſed in the Roman law for a pledge in money, which both the plaintiff and defendant in a real action laid down in court to be forfeited by him who ſhall loſe the cauſe.

SACRAMENTARIANS, a name given by the romaniſts to all ſuch as, in their opinion, entertain erroneous doctrines of the ſacrament of the Lord's ſupper, and chiefly uſed by way of reproach to Lutherans, Caviniſts, and other proteſtants.

SACRAMENTARY, an antient romiſh church-book, which contains all the prayers and ceremonies practiſed at the celebration of the ſacraments.

It was wrote by pope Gelaſius, and afterwards reviſed, corrected, and abridged by St. Gregory.

SACRED, ſomething holy, or that is ſolemnly offered and conſecrated to God, with benedictions, unctions, &c. Thus kings and prieſts are held ſacred perſons; the deaconhood, ſub-deaconhood, and prieſthood, are all ſacred orders, and impreſs a ſacred indelible character. The ſacred college is that of the cardinals.

Sacred is alſo applied to things belonging to God and the church. Thus churches, church-lands, ornaments, &. are held ſacred. But, in civil law, a ſacred place chiefly denotes, that where a perſon deceaſed has been interred.

Sacred majeſty is applied to the emperor and the king of England; though this title has by ſome been thought blaſphemous.

SACRIFICE, a ſolemn act of religious worſhip, which conſiſted in dedicating or offering up ſomething animate or inanimate on an altar, by the hands of the prieſt, either as an expreſſion of their gratitude to the deity for ſome ſignal mercy, or to acknowledge their dependance on him, or to conciliate his favour. The origin of ſacrifices is by ſome aſcribed to the Phœnicians, but Porphyry aſcribes it to the Egyptians, who firſt offered the firſt fruits of their grounds to the gods, burning them upon an altar of turf: thus in the moſt antient ſacrifices there were neither living creatures, nor any thing coſtly or magnificent; and no myrrh or frankincenſe. At length they began to burn perfumes; and afterwards men leaving their antient diet of herbs and roots, and beginning to uſe living creatures for food, they began alſo to change their ſacrifices. The ſcriptures, however, furniſh us with a different account; for Noah, it is ſaid, ſacrificed animals at his coming out of the ark; and even Abel himſelf ſacrificed the beſt and fatteſt of his flock; but Grotius thinks it more probable that he contented himſelf with making a mere oblation of his lambs, &c. without ſlaying them.

The Jews had two ſorts of ſacrifices, taking the word in its largeſt ſignification: the firſt were offerings of tythes, firſt-fruits, cakes, wine, oil, honey, and the like; and the laſt, offerings of ſlaughtered animals. When an Iſraelite offered a loaf or a cake, the prieſt broke it in two parts, and ſetting aſide that half which he reſerved for himſelf, broke the other into crumbs, poured oil, wine, incenſe, and ſalt upon it, and ſpread the whole upon the fire of the altar. If theſe offerings were accompanied with the ſacrifice of an animal, they were thrown upon the victim to be conſumed along with it. If the offerings were of the ears of new corn, they were parched at the fire, rubbed in the hand, and then offered to the prieſt in a veſſel, over which he poured oil, incenſe, wine and ſalt, and then burnt it upon the altar, having firſt taken as much of it, as of right belonged to himſelf.

The principal ſacrifices among the Hebrews conſiſted of bullocks, ſheep and goats; but doves and turtles were accepted from thoſe who were not able to bring the other; theſe beaſts were to be perfect and without blemiſh. The rites of ſacrificing were very various, all of which are minutely deſcribed in the books of Moſes.

The manner of ſacrificing among the Greeks and Romans was as follows: in the choice of the victim, they took care that it was without blemiſh or imperfection; its tail was not to be too ſmall at the end; the tongue not black, nor the ears cleft; and that the bull was one that had never been yoked. The victim being pitched upon, they gilt his forehead and horns, eſpecially if a bull, heifer, or cow. The head they alſo adorned with a garland of flowers, a woollen infula or holy fillet, whence hung two rows of chaplets with twiſted ribbands; and on the middle of the body a kind of ſtole, pretty large, hung down on each ſide; the leſſer victims were only adorned with garlands and bundles of flowers, together with white tufts or wreaths.

The victims thus prepared, were brought before the altar; the leſſer being driven to the place, and the greater led by an halter; when if they made any ſtruggle, or refuſed to go, the reſiſtance was taken for an ill omen, and the ſacrifice frequently was ſet aſide. The victim thus brought, was carefully examined, to ſee that there was no defect in it: then the prieſt, clad in his ſacerdotal habit, and accompanied with the ſacrificers and other attendants, and being waſhed and purified according to the ceremonies preſcribed, turned to the right hand

and

and went round the altar, ſprinkling it with meal and holy-water, and alſo beſprinkling thoſe who were preſent. Then the cryer proclaimed with a loud voice, Who is here? To which the people replied, Many and good. The prieſt then having exhorted the people to join with him by ſaying, Let us pray, confeſſed his own unworthineſs, acknowledging that he had been guilty of divers ſins; for which he begged pardon of the gods, hoping that they would be pleaſed to grant his requeſts, accept the oblations offered them, and ſend them all health and happineſs; and to this general form added petitions for ſuch particular favours as were then deſired. Prayers being ended, the prieſt took a cup of wine, and having taſted it himſelf, cauſed his aſſiſtants to do the like; and then poured forth the remainder between the horns of the victim. Then the prieſt, or the cryer, or ſometimes the moſt honourable perſon in the company, killed the beaſt, by knocking it down, or cutting its throat. If the ſacrifice was in honour of the celeſtial gods, the throat was turned up towards heaven; but if they ſacrificed to the heroes or infernal gods, the victim was killed with its throat towards the ground. If by accident the beaſt eſcaped the ſtroke, leaped up after it, or expired with pain and difficulty, it was thought to be unacceptable to the gods. The beaſt being killed, the prieſt inſpected its intrails, and made predictions from them. They then poured wine, together with frankincenſe, into the fire, to increaſe the flame, and then laid the ſacrifice on the altar; which in the primitive times was burnt whole to the gods, and thence called an holocauſt; but in after-times, only part of the victim was conſumed in the fire, and the remainder reſerved for the ſacrificers; the thighs and ſometimes the entrails being burnt to their honour, the company feaſted upon the reſt. While the ſacrifice was burning, the prieſt, and the perſon who gave the ſacrifice, jointly prayed, laying their hands upon the altar. Sometimes they played upon muſical inſtruments in the time of the ſacrifice, and on ſome occaſions they danced round the altar, ſinging ſacred hymns in honour of the gods.

SACRILEGE, the crime of profaning ſacred things, or thoſe devoted to the ſervice of God.

SACRISTAN, *Sacriſta*, a church officer, otherwiſe called ſexton.

SACRISTY, *Sacriſtia*, in church hiſtory, an apartment in a church, were the ſacred utenſils were kept; being the ſame with our veſtry.

SACRO LUMBARIS, in anatomy, one of the exterior muſcles of the back and loins, has its origin at the os ſacrum and the poſterior ſpine of the ilium, and its termination in the upper part of the ribs.

SACRUM Os, the ſacred bone, in anatomy, the lower extremity of the ſpina dorſi, being a bone, of a triangular figure, with a rough ſurface; its ſubſtance is ſpongy, and it has two lateral apophyſes for its articulation with the oſſa innominata; alſo two ſmaller upper apophyſes, with glenoide cavities for the articulation into the lower vertebra; and an inferior apophyſes, for its articulation with the os coccygis: it has alſo a canal for the end of the ſpinal marrow.

SADDLE, is a ſeat upon a horſes, back, contrived for the conveniency of the rider.

SADDLE-GALLEC, in farriery. See the article GALLING.

SADDUCEES, in Jewiſh antiquity, a famous ſect among the antient Jews, ſo called from their founder Sadoc Antigonus of Socho, preſident of the ſanhedrim at Jeruſalem, and teacher of the law in the principal divinity-ſchool of that city. Having often, in his lectures, aſſerted to his ſcholars, that they ought not to ſerve God in a ſervile manner, with reſpect to reward, but only out of filial love and fear; two of his ſcholars, Sadoc and Baithus, inferred from thence, that there were no rewards or puniſhments after this life: and, therefore, ſeparating from the ſchool of their maſter, they taught that there was no reſurrection, nor future ſtate. Many embracing this opinion, gave riſe to the ſect of the Sadducees, who were a kind of Epicureans, but differing from them in this, that though they denied a future ſtate, yet they allowed the world was created by the power of God, and governed by his providence; whereas the followers of Epicurus denied both.

The Sadducees denied all manner of predeſtination whatever, and not only rejected all unwritten traditions, but alſo all the books of the Old Teſtament, excepting the pentateuch.

SAFE CONDUCT, a ſecurity given by the king under the great ſeal to a foreigner, for his ſafe coming into and paſſing out of the kingdom.

SAFE-GUARD, a protection formerly granted to a ſtranger who feared violence from ſome of the king's ſubjects, for ſeeking his right bycourſe of law.

SAFFRON, *Crocus*, in botany, &c. See the article CROCUS.

SAFFRON, *Crocus*, is alſo a name given to ſeveral chemical prepartions, from their reſembling the vegetable ſaffron in colour. See the article CROCUS.

Meadow-SAFFRON, *Colchicum*, in botany, &c. See the article COLCHICUM.

SAGAPENUM, in pharmacy, &c. a gum-reſin, brought to us in two forms; the finer and purer is in looſe granules, or ſingle drops; the coarſer kind is in maſſes compoſed of theſe drops of various ſizes, cemented together by a matter of the ſame kind. In either caſe it is of a firm and compact ſubſtance, conſiderably heavy, and of a reddiſh colour on the outſide, browniſh within, and ſpotted in many places with ſmall yellowiſh or whitiſh ſpecks. Its ſmell is ſtrong and diſagreeable; its taſte acrid and unpleaſant.

Sagapenum is a very great attenuant, aperient and diſcutient; it is good in all diſorders of the breaſt that owe their origin to a tough phlegm. It has alſo been found to diſcuſs tumours in the nervous parts, in a remarkable manner, and to give relief in habitual head-achs, where almoſt all things elſe have failed. Its doſe is from ten grains to two ſcruples, but it is now ſeldom given alone. It has been found, however, to do great things in aſthmas, in obſtructions of the viſcera, particularly the ſpleen, in nervous complaints, and even in epilepſies. It alſo promotes the menſes, and expels the ſecundines; and is an ingredient in the theriaca, mithridate, and many other of the ſhop compoſitions.

SAGATHEE, in commerce, a ſlight kind of woollen ſtuff, ſerge, or ratteen, ſometimes mixed with a little ſilk.

SAGE, *Salvia*, in botany, a genus of plants, whoſe flower is monopetalous, and tubular ringent at the mouth; the upper-lip concave, compreſſed, incurved, and emarginated; the lower-lip is broad and trifid; there is no pericarpium, but the ſeeds, which are roundiſh, and four in number, are contained in the bottom of the cup. There are ſeveral ſpecies of ſage, the moſt common are the red ſage, green ſage, ſage of virtue, or narrow-leaved ſage, and ſage with variegated leaves; theſe are propagated by ſlips, which ſhould be planted in April, in a ſhady border of light rich earth; and when ſufficiently rooted, may be tranſplanted where they are intended to remain; which ſhould be in a dry ſoil, as they are apt to be deſtroyed in hard winters if planted in moiſt land.

Sage is accounted cephalic and ſudorific; it is very good againſt the apoplexy, epilepſy, palſy, and trembling of the limbs; it is uſed in the manner of tea, againſt any of the abovementioned diſorders, as well as for a preſervative. It is very good for diſorders of the brain, to promote the circulation of the fluids, to ſtrengthen the ſtomach, and to promote digeſtion; it has an auſterity on the palate; and makes a very good gargariſm, if ſharpened with a little acid. It is commonly ſaid, that the Chineſe wonder we ſhould buy their tea, when we have ſo much ſage, which they reckon more excellent.

As to external uſe, the leaves and flowers are often employed in fomentation, to ſtrengthen the nerves, and to diſcuſs the ſwelling of wounds.

To this genus Linnæus has added the horminum and ſelarea of Tournefort.

Wild SAGE. See TEUCRUM.

SAGE *of Jeruſalem*. See PHLOMIS.

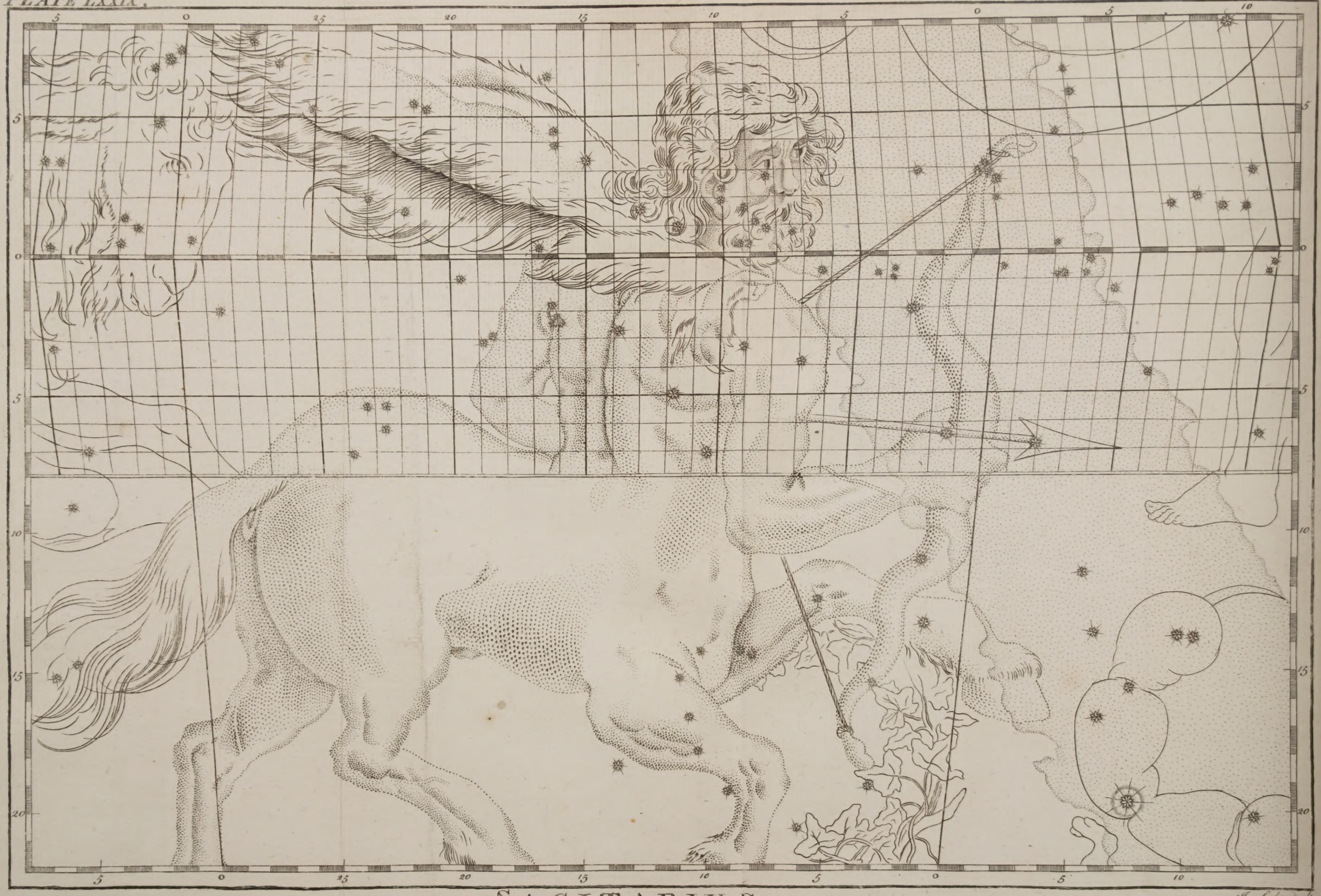
SAGENE, a Ruſſian long meaſure, five hundred of which make a werſt: the ſagene is equal to ſeven Engliſh feet.

SAGINA, in botany, a genus of plants, whoſe flower conſiſts of four ovate, obtuſe, and patent petals, with four capillary filaments, topped with roundiſh antheræ. The fruit is an ovate, quadrilocular capſule, opening with four valves, and containing numerous ſmall ſeeds affixed to the receptacle.

SAGITTA, in aſtronomy, the arrow, or dart, a conſtellation of the northern hemiſphere, near the eagle; conſiſting of five ſtars, according to Ptolemy and Tycho; but in Mr. Flamſtead's catalogue, of no leſs than twenty-three. The latitude and longitude of which are as follow.

Names and Situations of the Stars.	Signs.	Longitude ° ′ ″	Latitude North. ° ′ ″	Mag.
	♐	21. .08	43. 7.45	6
		21.20.24	43.15.10	6
		22.45.45	38.31.25	6
Informes over Sagitta, and preceding it — — — —		22.53.27	38.31.18	6
		22.47.43	41.16.27	6
5.				
		24. 7.32	41.32.45	6
		25. 7.59	41.34.28	6 5
		26.35.50	40.49.26	6
Preced. glyphis or nib tow. S. — — — —		26.29.42	37.27. 9	5
Preced. of three in the ſhaft — — — —		27.45.16	38.49.52	4
10.				
In the extremity of the nib — — — — —		27.53.23	38.15.17	4
In the middle of the ſhaft — — — — —	♒	4.40	38.56.52	4 5
Laſt of three in the ſhaft — — — — —		43.47	39.27. 5	6
		1.35.41	38.48.23	6
		2. 2.13	36.36.54	6
15.				
		1.34.53	36.39.43	6

Facing Sagitarius.



SAGITARIUS.

T. Ledger sculp.

Names and Situations of the Stars.	Signs.	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ″	
In the point of the arrow		3.42.58	39.13.39	4
In the triangle under the point { north		3.28. 6	37.14. 3	6
In the triangle under the point { south		4. 24	35.35. 6	6
Middle and poſterior		4.33.10	36.35. 2	6
20.				
Preced. of three following the point		5.46.28	39.18.22	6
Middle		7.29.53	39.52.58	6
Laſt	♐	9.37.48	40. 7.17	6

SAGITTA, in botany, implies the top of any ſmall twig, cyon, or graft of a tree.

SAGITTA, in trigonometry, the ſame with the verſed ſine of an arch.

SAGITTAL, *Suture*, in anatomy, the ſecond of the genuine ſutures of the cranium or ſkull.

SAGITTARIA, arrow-head, in botany, a genus of aquatic plants, producing male and female flowers on the ſame plant; the male corolla conſiſts of three roundiſh, obtuſe, plane, patent petals, thrice the length of the cup, with a great number of ſtamina; the female corolla is like that of the male; there is no pericarpium; the receptacle, which is globoſe, collects the ſeeds into a head; the ſeeds are numerous, oblong, compreſſed, and ſurrounded longitudinally with a broad membranaceous border.

Arrow-head grows naturally in ſtanding waters, in moſt parts of England; the root is compoſed of ſtrong fibres which ſtrike deep in the mud; the footſtalks of the leaves are of the depth of the water where they grow, the leaves laying flat on the ſurface, and are ſhaped like the point of an arrow; the two ears at their baſe ſpreading wide aſunder. The flowers come out in July, and are produced on long ſtalks riſing above the leaves, and ſtanding in worles round the joints, and are of a white colour.

SAGITTARIUS, the archer, in aſtronomy, the ninth ſign of the zodiac. See the article ZODIAC.

The ſtars in this conſtellation in Ptolemy's catalogue are thirty-two, in Tycho's ſixteen, and in Mr. Flamſtead's fifty; the latitude and longitude of which are as follow. (See plate LXXIX.)

Names and Situations of the Stars.	Signs	Longitude.	Latitude	Magn.
		° ′ ″	° ′ ″	
Inform. preceding the bow	♐	23.55. 1	4.22.42	S 6
Nebulous Stars		26.38.16	19.45	S 6
Nebulous Stars		26.43.17	47.41	S 7
Nebulous Stars		27.19.47	47.50	S 6
That in the point of the arrow		27.55.47	6.55.51	S 3
5.				
More north in the top of the bow		29.54.10	2.22.54	N 4
Subſeq.	♑	15. 5	2.42.28	N 6
In handle of bow againſt hand		1.14.10	6.25.21	S 3
In the ſouth part of the bow		1.45.33	10.59.54	S 23
		2. 4.55	7.24.47	S 7
10.				
		2.37.40	2.48.39	N 6
South in the north part of the bow		2.59.55	2. 4. 1	S 4
Preceding the clara humeri		6.50.42	3.54.35	S 4
		8.19.56	2.39.12	N 6
		8.26.23	48.34	N 7
15.				
		8.45.55	1. 1.30	N 7
Firſt of contig. ſtars in the eye		9. 9. 7	9.12	N 5
		9.15. 9	1.32. 3	N 6
Bright ſtar in preced. ſhoulder		9. 3.12	3.23.32	S 3
Subſeq. of contig. in the eye		9.22.14	12.33	N 5
20.				
		10. 6. 9	2. 9.25	N 6
Preced. of three in the head		10. 8.52	1.42.12	N 4

Names and Situations of the Stars.	Signs.	Longitude.	Latitude.		Magn.
		° ′ ″	° ′ ′		
That under the armpit	♑	10.17.22	7. 7.55	S	3
Middle one in the head		11.40.42	54.38	N	4
That under preced. ſhoulder bone		11.30.10	5. 1.12	S	4
25.					
Left of three in the head		12.56.44	1.28.59	N	3 4
Between the ſhoulders		13.43. 6	2.52.57	S	5
In the north. part of the ephaptis of three { ſouth		15. 2.22	3.17.59	N	6
In the north. part of the ephaptis of three { middle		16. 8.20	4.15.43	N	5
Contiguous to that		16. 6.17	3.48.43	N	6
30.					
North of three in the ephaptis		16.21.49	6. 8.42	N	6
In the hind. ſhoulder		16. 19	2.26.17	S	5
Contiguous to that		16. 2.43	2.21. 5	S	6
A third more north.		16. 7.46	1.54.36	S	6
		16.39. 4	12.20	N	6
35.					
		18.24.12	3. 1.53	S	6
In the cubit. of fol. arm		18.31.15	3.13. 1	S	5
		19.28. 4	1.54. 4	S	6
Thoſe following the north. part of { preced.		20.53.56	5. 5.54	N	6
epaph. of two { ſubſeq.		21.20.29	5.11.26	N	6 5
40.					
Preced. in ſouth. ephaptis		21.37.36	1.27. 2	N	6
		23. 6. 2	1.54. 3	N	6
Preced. in root of tail		22.29.46	5.22.55	S	5
Of four middle ones in the root of the tail { ſouth.		22.25.15	6.16.34	S	5
Of four middle ones in the root of the tail { north.		23.13.16	5.24.44	S	5
45.					
Second and north. in ſouth ephaptis		25. 7.49	5. 8. 3	N	6
Second in the root of the tail		23.43.30	7. 3.48	S	5
		26.27.19	6.54.32	N	6
		27.38. 1	8.44.40	N	6
		27.29.17	7.31.45	N	6
50.					

SAGO, a ſimple brought from the Eaſt-Indies, of conſiderable uſe in diet as a reſtorative.

SAICK, or SAIQUE, a Turkiſh veſſel, very common in the Levant, for carrying of merchandize.

SAIL, in navigation, an aſſemblage of ſeveral breadths of canvas, ſewed together by the liſts, and edged round with a cord, faſtened to the yards of a ſhip, to make it drive before the wind.

SAILS alſo denote the vanes of wind-mills. See the article WIND-MILL.

SAILING, properly denotes the art of navigating and working a ſhip, or of cauſing her to obſerve ſuch motions and directions as are aſſigned by the navigator; in which ſenſe, ſailing differs from navigation, and muſt be learned by practice on ſhip-board.

The moſt advantageous poſition of the ſails and rudder of a ſhip, has been already treated of under the article MAXIMUM; which ſee.

SAILING, alſo denotes a particular method of navigation; in which ſenſe we ſay, great-circle ſailing, Mercator's ſailing, middle-latitude ſaling, parallel ſailing, and plain or plane ſailing.

Great-Circle SAILING, in navigation, the art of finding what places a ſhip muſt go through, and what courſes to ſteer; ſo that her tract ſhall be in the arch of a great-circle, or nearly ſo, paſſing thro' the place ſailed from and that bound to.

It is chiefly on account of the ſhorteſt diſtance, that this method of ſailing has been propoſed; for in the ſphere, it is well known, that the ſhorteſt diſtance between two places is the arch of a great circle intercepted between them, and not in the rhumb or ſpiral paſſing through thoſe places. See the article RHUMB.

Mercator's SAILING, is the method of navigating a ſhip on the principles laid down by our countryman Mr. Wright, and falſly aſcribed to Mercator. It conſiſts in projecting a ſea-chart on a plane, ſo that

that the crooked ſpiral lines on the globe, become right-lines in the projection, and ſtill in the ſame proportion with the curve lines on the globe.

Middle-Latitude SAILING, is the method of keeping an account of a ſhip's way, by computing the miles or longitude on the parallel of the middle latitude; as that parallel which is equally diſtant from the latitude ſhe departed from, and that under which ſhe is arrived.

Parallel SAILING, is the method of conducting a ſhip when ſailing due eaſt or weſt, under any parallel of latitude.

Plain or *Plane* SAILING, is the method of navigating a ſhip which ſuppoſes the earth to be an extended plane, and the meridians and parallels of latitude at equal diſtances from one another.

SAILORS, the elder ſeamen, who are employed in working or managing the ſails, the tackle, ſteering, &c. See NAVAL *Affairs*, SEAMEN, &c.

SAINT, in the Romiſh church, a holy perſon deceaſed, and ſince his deceaſe canonized by the pope, after ſeveral informations and ceremonies.

SAINT *John's-Wort*, *Hypericum*, in botany. See HYPERICUM.

SAINT *Peter's-Wort*, *Aſcyrum*, in botany. See ASCYRUM.

SAINT-FOIN, *Anabrychis*, in botany, a plant much eſteemed for foddering cattle.

The beſt ſeaſon for ſowing it is in April, taking the advantage of dry weather; the common quantity allowed, is four buſhels to the acre: the firſt year it ſhould not be fed, for the crown of the root being young and tender, the cattle would eat it ſo low, as entirely to deſtroy the roots; and if large cattle were admitted on it, they would trample it down ſo much as to prevent its ſhooting again; therefore, it ſhould be mowed the firſt year, when it is in flower, and made into hay.

This ſort of hay is exceeding good for horſes, and is eſteemed one of the beſt ſorts of food for moſt cattle, eſpecially in the ſpring, there being no danger attending it, as there is in clover and ſome other ſorts of fodder; it breeds abundance of milk, and the butter that is made of it is very good.

The proper ſoil for ſaint-foin, is a dry, gravelly, or chalky ground, on which it will continue eighteen or twenty years without renewing.

SAKER, a ſmall ſort of cannon, whereof there are three ſpecies, extraordinary, ordinary, and middle-ſized. See the article CANNON.

SAL, in chemiſtry, &c. the ſame with ſalt. See the article SALT.

SALAMANDER, *Salamandra*, in zoology, a name given by authors to ſeveral ſpecies of the lizard kind; but the principal are two, the ſalamandra-aquatica (the water-newt) and the ſalamandra-terreſtris.

The ſalamandra-aquatica is the two-edged-tailed lizard, with four toes on the anterior, and five on the hinder, feet: it grows to about four inches in length, and to the thickneſs of a man's finger; the back is of a deep ſhining brown, and the belly of a bright gloſſy yellow.

The ſalamandra-terreſtris, or land ſalamander, is a ſpecies of lizard, the tail of which is ſhort, and its colour of a fine black, marked with red ſpots of a bright and ſhining gloſſy appearance.

SALAMANDER's-*Blood*, among chemiſts, denotes the redneſs remaining in the receiver, after diſtilling the ſpirit of nitre.

SALARY, *Salarium*, a recompence made to a perſon, for his pains or induſtry about another perſon's buſineſs, as in the caſe of officers, &c. And it is generally taken for any wages, ſtipend, or allowance.

SALE, in general, ſignifies the transfering the property of goods, from one to another, upon ſome valuable conſideration; as where, in a bargain, one agrees to give another a certain ſum of money for ſuch goods, and thereupon gives the ſeller earneſt, which he accepts; this is a perfect ſale, and ſhall bind the buyer and ſeller.

SALEP, in the materia medica, the root of a ſpecies of orchis. See the article ORCHIS.

Salep ſhould be choſen clean, firm, and hard; it is very little liable either to decay or ſophiſtication. The ſalep differs very little from the common orchis in virtue. Its appearance is owing to the manner of preparing it, and conſequently this may be done from the roots of orchis of our own growth.

To prepare theſe in imitation of ſalep, Mr. Geoffroy choſe the largeſt, faireſt, and plumpeſt roots he could find: theſe he nicely ſkinned; then throwing them into cold water, he ſuffered them to macerate there for ſome time: after this, he lightly boiled them; and then, taking them out of the water and draining them, he had them ſtrung upon threads, to be dried in a warm dry air: when the roots were thoroughly dried, they were very tranſparent, and reſembled pieces of tragacanth, and continued dry and hard.

The roots thus prepared may be reduced to powder, which will diſſolve away in boiling water, and a ſcruple of it will make a baſon full of jelly, in the manner of the Turkiſh ſalep.

This jelly is an admirable medicine in all caſes in which ſalep is preſcribed; and the powder may be given with great ſucceſs in aſſes-milk, for diſeaſes of the breaſt. The people of the Eaſt-Indies look upon ſalep to be one of the greateſt reſtoratives and provocatives to venery in the whole vegetable world. The ſalep which we receive from Turky is always a tranſparent root, of a whitiſh or reddiſh colour, according to its different age, and is chiefly recommended in conſumptions, bilious dyſenteries, and diſorders of the breaſt, proceeding from an acrimony of the juices.

SALET, SALLET, or SALADE, in war, a light covering

covering or armour for the head, anciently worn by the light-horſe, only differing from the caſk in that it had no creſt, and was little more than a bare cup.

SALIANT, in fortification, denotes projecting. There are two kinds of angles, the one ſaliant, which are thoſe that preſent their points outward; the other re-entering, which have their points inward. Inſtances of both kinds we have in tenailles and ſtar-works.

SALIANT, SALIENT, or SAILLANT, in heraldry, is applied to a lion, or other beaſt, when its fore-legs are raiſed in a leaping poſture.

SALIC, or SALIQUE LAW, *Lex Salica*, an ancient and fundamental law of the kingdom of France, uſually ſuppoſed to have been made by Pharamond, or at leaſt by Clovis, in virtue whereof males are only to inherit.

Du Haillan, after a critical examination, declares it to have been an expedient of Philip the Long, in 1316, for the excluſion of the daughter of Lewis Hutin from inheriting the crown. Father Daniel, on the other hand, maintains that it is quoted by authors more ancient than Philip the Long, and that Clovis is the real author of it.

This law has not any particular regard to the crown of France; it only imports, in general, that in ſalic land no part of the inheritance ſhall fall to any female, but the whole to the male ſex.

By ſalic lands, or inheritances, were anciently denoted, among us, all lands, by whatever tenure held, whether noble or baſe, from the ſucceſſion whereto women were excluded by the ſalic law; for they were by it admitted to inherit nothing but moveables and purchaſes wherever there were any males.

SALICARIA, in botany, Tournefort's name for the lythrum. See the article LYTHRUM.

SALICORNIA, in botany, a genus of plants, whoſe flower hath no corolla; the cup is four-cornered, truncated, ventricoſe, and perſiſtent, and contains but one filament, topped with two oblong antheræ: there is no pericarpium, but the cup becomes more ventricoſe, and contains a ſingle ſeed.

A decoction of the leaves of this plant is very opening, provokes urine and the menſes, accelerates the birth and ſecundines, purges watry humours, whence it is of ſervice in a dropſy. Its aſhes are uſed in making ſoap and glaſs; and being infuſed in water, cure the itch and all cutaneous diſeaſes, the part affected being waſhed therewith.

SALIVA, ſpittle, a thin pellucid humour, ſeparated from the arterial blood, by the glands about the mouth and fauces, and conveyed by proper ſalival ducts, into the mouth, for ſeveral uſes.

It conſiſts of a great deal of water or phlegm, and a volatile ſalt, and ſome add a ſulphureous ſpirit; and is void both of taſte and ſmell.

Its uſes are very great; it moiſtens the throat, preſerves it from the injuries of the air, and facilitates ſpeech. Being mixed with aliment, it renders ſwallowing eaſy, and aſſiſts digeſtion by its aqueous, ſaline, and oily parts. Some imagine it to do the office of a menſtruum, by mixing the oily and aqueous parts of the food more intimately, diſſolving the ſaline parts, and procuring a fermentation in the ſtomach; but Dr. Drake is of opinion, that was the ſaliva acrimonious enough for this purpoſe, it muſt greatly offend the ſtomach, eſpecially conſidering the quantities of it that many ſwallow, even upon an empty ſtomach. In hungry perſons, ſays Boerhaave, it is fluid, acrid, and copiouſly diſcharged; and in thoſe who have faſted long, it is highly acrid, penetrating, and reſolvent. In farinaceous and ſucculent vegetables, it not only produces a fermentation, but alſo augments one already begun. It is ſwallowed not only by brutes, but by human creatures, in a ſound ſtate, even when aſleep. Too copious an evacuation of it, made voluntarily, produces loſs of appetite, bad digeſtion, and an atrophy. By manducation, therefore, the ſaliva is expreſſed and accurately mixed with the attenuated food; which contributes, firſt, to the aſſimilation of the aliments to the nature of the body to be nouriſhed; ſecondly, to the due mixture of the oleous to the aqueous parts; thirdly, to the ſolution of the ſaline parts; fourthly, to fermentation; fifthly, to a change of the taſte and ſmell of the aliments; ſixthly, to an augmentation of the inteſtine motion; ſeventhly, to a momentaneous relief from hunger; and, eighthly, an application of the ſapid parts, though inſipid itſelf. See the articles CHYLIFICATION, MANDUCATION, DIGESTION, &c.

SALIVAL, an epithet applied to the glands and ducts which ſupply and ſecrete the ſaliva. See GLAND, DUCT, and the preceding article.

SALIVATION, in medicine, a promoting of the flux of ſaliva, by means of medicines, moſtly by mercury. The chief uſe of ſalivation is in diſeaſes belonging to the glands, and the membrana adipoſa, and principally in the cure of the venereal diſeaſe, though it is ſometimes alſo uſed in epidemic diſeaſes, cutaneous diſeaſes, &c. whoſe criſes tend that way. See the articles POX, &c.

A ſalivation is excited according to Boerhaave, 1. By waſhing the mouth with certain liquors. 2. By the ſlow and protracted maſtication of ſome viſcid matter, ſuch as maſtich, wax, and myrrh, eſpecially if acrid ſubſtances are mixed with theſe, ſuch as pellitory of Spain, pyrethrum, ginger, and pepper. 3. By drawing into the mouth acrid and irritating vapours, ſuch as thoſe of tobacco, ſage, roſemary, marjoram, thyme, and mother of thyme. 4. A ſalivation is excellently excited by the action of ſuch medicines as produce a gentle but long continued naufea, ſuch as antimony, neither entirely fixt,

fixt nor totally emetic, taken with a ſmall quantity of common vitriol. 5. By ſuch ſubſtances as totally diſſolve all the parts of the blood, convert it into lymph, and render it fit for a diſcharge by way of ſaliva; ſuch as crude quickſilver, cinnabar, a ſolution of quickſilver in aqua fortis, white precipitate, red precipitate, turbith mineral, and ſublimate mercury diſſolved: the action of thoſe medicines is promoted by warm fomentations applied to the head, neck, and face. An exceſſive ſalivation is leſſened or ſtopped, 1. By a large and continual uſe of mild and tepid drinks, ſuch as decoctions of mallows and liquorice in milk and water. 2. By allaying the impetus of the humours, by means of mild, oleous, and anodyne emulſions, with a proper addition of diacodium or opium. And, 3. By making a revulſion of the humours to other parts, eſpecially that by ſtool. But great caution is neceſſary, leſt the impetus of the moved matter, which in this caſe is always acrid, ſhould ruſh to other parts, and produce a greater danger.

The regular, ſafeſt, and moſt commodious method of ſalivation is by mercurius dulcis ſix times ſublimed, given inwardly in the milder pox, &c. or by mercurial unction, when the diſeaſe is got into the bones. According to Turner, fifteen grains of mercurius dulcis may be given in a morning, and a like doſe at night, with electuary of ſcordium. After three, four or five days, with this management, the fauces are obſerved to inflame, the inſide of the cheeks to tumify, the tongue to look white and foul, the gums to ſtand out, the breath to ſtink, and the whole inſide of the mouth to appear ſhining and lie in furrows as if parboiled. The patient now refuſes nouriſhment, while all parts of his chaps are ſo ſwelled and ſore that he cannot chew any ſolid food, but is forced to take liquids and the ſofter aliments. They are now frequently ſick, and throw up a thin phlegm. The inſide of the mouth thus beginning to be whealed, will ſoon be ulcerated, eſpecially about the ſalival glands, which empty themſelves thereinto. Now it may be proper to deſiſt a day or two, to obſerve the increaſe of the ulcers, what ſloughs are like to be raiſed, and what their depth and dimenſions are like to prove, from which a near conjecture may be made of the duration as well as quantity of the ſpitting now begun, and the conſiſtence of the drilling lympha. The ſalivation thus begun, the patient is to be ſometimes refreſhed by a little mulled wine. Let his diet be ſmall chicken-broth, water-gruel and panada; his drink ſmall ſack whey, or poſſet drink, and a draught of good ſmall beer, with a toaſt, between whiles; and in caſe of gripes or a looſeneſs, the white decoction.

Thus, after ſome days reſpite, if the patient is hearty, his chaps but little ſwelled on the outſide, and as little ſore within, the ulcers not increaſing, and the flux inconſiderable, you may give one ſcruple of mercurius dulcis in electuary of ſcordium at going to reſt, repeating it two or three days following, as you find occaſion; or you may vomit him with eight or ten grains of turpeth mineral, in conſerve of roſes: but if the ſalivation cannot be raiſed to any quantity, you muſt forbear, and purge it off, and give calomel once or twice a week, and purge it off the next day, or two days after. When the ſpitting goes well forward, it may be left to take its courſe, till it declines of itſelf, which, in proportion to the ulcers and thickneſs of the ſloughs about the mouth, may happen at the end of twenty-one days or a month from its firſt riſing; that is, from the time of ſpitting a pint and a half a day, till it come to three pints or even five pints in twenty-four hours, then it gradually goes off again.

In the more ſtubborn and rebellious pox, &c. attended with grievous ſymptoms, ſuch as rotten bones, &c. and the patient has been uſed to mercurials, or ſalivated before, then the cure muſt be attempted with ſalivation by unction. To this end mix an ounce of quickſilver with three ounces of axungia, of which an eight part is to be uſed night and morning, letting the patient rub it with his own hands gently by the fire, beginning with his ancles, up to his ſhins and knees, all round his joints, and ſo to his thighs, which are preſently after to be covered with yarn ſtockings and flannel-drawers; then let him uſe the remainder of his eight part above his elbows and ſhoulders, wiping his hands clean about the glands of his arm-pits, or thoſe of his groin: his body during the unction, ſhould be ſcreened from the cold with a blanket hung behind him, and then be wrapped up in warm flannel, that is a flannel-ſhirt, waiſtcoat, drawers, cap and muffler. And the ſame is requiſite in the former way, to defend the patient from the cold air. The weak need only to anoint once a day; but thoſe that are ſtrong, may take a fourth part of the ointment, and rub it in at once every night; after which let him get between flannel-ſheets or blankets, diſpoſing him to a gentle breathing ſweat with a draught of warm poſſet, mace ale, or if very feeble, with a cup of mulled wine. If, when the ointment is divided into four parts, after the third unction, the patient begins to complain of his chaps, you may ſtay a day or two before you proceed farther; the ſame when gripes or bloody ſtools approach. On the other hand, if an ounce or an ounce and an half of quickſilver will not do, give the turpeth, as before directed: and if the ſpitting declines too ſuddenly, give a ſcruple of calomel every day, for two or three times, as you ſee occaſion. When the ſalivation is going off, the patient may be purged with two or three ounces of the common infuſion of ſenna, and one ounce of the ſyrup of buckthorn.

For

For the ſeveral diſeaſes that ſupervene a ſalivation, ſee each of them ſeparately treated of, under their ſeveral heads.

To prevent the jaws from being locked up, it is neceſſary to uſe a bit of ſtick, covered with a ſoft rag, to be held between his backward teeth; and if there ſhould happen an adheſion of the inſide of the cheek to the gum, the ſame is to be carefully divided. If, during the ſalivation, a blood-veſſel burſt open, it is to be cloſed up with a little pellet, covered with powder of alum, or vitriol, and dipped in the tinctura ſtiptica: if it happens from the ſeparation of ſloughs from the ſides of the cheeks, a little oxycrate held in the mouth will do the buſineſs. If the patient has been without a ſtool for ſome time, give him an emollient clyſter of warm milk, ſugar, and oil; and if the fauces ſhould ſuddenly tumify, ſo as to endanger a ſuffocation, the moſt certain relief is to bring the humours downwards by ſharp clyſters and cathartics.

The patient ſhould be prepared for a ſalivation by a lenitive purge or two; and if plethoric, he ſhould bleed: likewiſe, bathing in warm water, for ſome hot, lean emaciated people, has been found of ſervice. Women ſhould be laid down juſt after their menſtrual flux is over. Temperate weather is the moſt ſuitable.

SALIX, the willow, in botany. See the article WILLOW.

SALLET, or SALLAD, a diſh of eatable herbs, ordinarily accompanying roaſt meat, compoſed chiefly of crude freſh herbage, ſeaſoned with ſalt, oil, and vinegar; ſome add muſtard, hard eggs, and ſugar; others pepper; and others ſpices, with orange-peel, ſaffron, &c.

The principal ſallet-herbs, and thoſe which ordinarily make the baſis of our ſallets, are lettuce, celery, endive, creſſes, radiſh, and rape; to which are ſometimes added purſlane, ſpinach, ſorrel, terragon, burnet, corn-ſallet, and chervil.

SALLOW, the ſame with willow. See the article WILLOW.

SALLY, in architecture, is what we more commonly call projecture. See the article PROJECTURE.

SALLY, in the military art, the iſſuing out of the beſieged, from their town or fort, and falling upon the beſiegers in their works, in order to cut them off, nail their cannon, hinder the progreſs of their approaches, deſtroy their works, &c.

SALMON, *Salmo*, in ichthyology, a genus of the malacopterygious claſs of fiſhes, having large, ſharp, and ſtrong teeth in both jaws, and on the palate, tongue, and fauces; the back-fin is placed nearer the head of the fiſh than the ventral ones; the body is, in moſt of the ſpecies, variegated with ſpots; and the branchioſtege membrane contains ten, eleven, or twelve bones.

The ſeveral ſpecies of this fiſh are the common ſalmon, the trout, the red charr, &c. See the articles TROUT, &c.

SALON, or SALOON, in architecture, a very lofty ſpacious hall, vaulted at top, and ſometimes comprehending two ſtories or ranges of windows. The ſalon is a grand room in the middle of a building, or at the head of a gallery, &c.

Its faces or ſides ought all to have a ſymmetry with each other; and, as it uſually takes up the height of two ſtories, its ceiling, as Daviller obſerves, ſhould be with a moderate ſweep.

Salons are frequently built ſquare, and ſometimes octagonal.

SALOP, in the materia medica, &c. See the article SALEP.

SALSAFY, in botany, a ſpecies of tragopogon, cultivated in gardens, being frequently uſed for ſeveral culinary purpoſes.

It is propaged from ſeeds, which ſhould be ſown in April, upon an open ſpot of ground, in rows, about nine or ten inches aſunder: when the plants are come up, they ſhould be thinned out to about ſix inches aſunder, in the rows; and if the ſoil be rich, and not too dry, the roots will be large enough for uſe by winter. Some cultivate it for the ſtalks, which are cut in the ſpring, when they are four or five inches high, and dreſſed and eaten as aſparagus.

SALSOLA, in botany, the name by which Linnæus calls the kali of other botaniſts. See the article KALI.

SALT, *Sal*, in natural hiſtory, the name of a ſeries or ſubdiviſion of foſſils, naturally and eſſentially ſimple, not inflammable, and ſoluble in water.

Dr. Shaw defines ſalt to be a ſubſtance that readily diſſolves in water, taſtes ſharp and pungent upon the tongue, and has a great diſpoſition to unite with earth, ſo as to appear in a ſolid form; as in common ſalt, allum, &c.

Salts then are foſſile bodies, friable, pellucid, not inflammable, but fuſible by fire, and congealing again in the cold; ſoluble in water, ſo as to diſappear in it, naturally concreting into regularly figured cryſtals, and impreſſing a ſenſation of acrimony on the tongue. Theſe are the characters and qualities common to all ſalts, and to no other bodies: and theſe they always manifeſt when pure and freed from heterogeneous ſubſtances; but in the ſtate in which they are naturally found in the earth, though they have that in their taſte alone which may ſufficiently diſtinguiſh them, yet they do not exhibit all their characters: ſome of them being found ſolid and pure, either within the earth or on its ſurface, but commonly without their proper form; others embodied in earths and ſtones, as the particles or metals in their ores; and others in a fluid ſtate ſuſpended in waters,

Of the foſſils of this claſs, nature therefore affords us three diſtinct orders, and under thoſe they are diſtinguiſhable into five genera. The ſalts of the firſt order are thoſe found native and pure, either in the earth or without its ſurface, and exhibiting all other natural characters, though often without their proper form. Of the ſecond, are thoſe found not native, but in form of ores, never pure, but diſtinguiſhable by their taſte, and immerſed in and blended with the conſtituent matter of earths and ſtones in extremely ſmall particles. And of the third are thoſe naturally found ſuſpended in waters, and in a fluid form, but ready to aſſume their proper figures on the evaporation of a part of that water.

Of the firſt of theſe orders are the common alimentary ſalt or muria, and the natrum or nitre of the antients; of the ſecond are alum and nitre; and of the third are borax and halcryptium, an alkaline ſalt hid in the chalybeate waters.

Alimentary ſalt, or muria, is found under a great variety of forms in its different ſtates; but is immediately diſtinguiſhed by applying it to the tongue, and always aſſumes a cubic, pyramidal, or parallelopiped figure after ſolution, and a regular cryſtallization. It is ſuſtained in vaſt quantities in a liquid form among ſea-water, and that of ſalt-ſprings; but is alſo found ſolid in the bowels of the earth in vaſt maſſes, which are either of a fine pellucid ſtructure, and called ſal-gem; or various, debaſed, and ſtriated, reſembling the fibroſe talcs, and is the ſal ammoniac of the ancients. See the articles GEM and AMMONIAC.

But in which ever of theſe forms this ſalt is found, it affords the ſame cryſtals on evaporation: theſe, according to the degree of heat uſed in the evaporation, are either pyramidal, cubic, or parallelopiped. All theſe ſalts are ſoluble in water, but they require different quantities of it to diſſolve them, and this makes one of their criterions. This ſalt requires thrice and one ſeventh part its own quantity of water, to make a perfect ſolution.

The ſea-water, in different parts of the world, is very differently ſated with it, ſome parts containing twice as much as others. But that of the ſalt ſprings is always much more ſalted with it, than the ſtrongeſt of the ſea-water: in ſome places it is found loaded with nearly as much as it could be made to contain, ſome ſprings yielding a brine that affords a quarter of a pound of ſalt, from the pound weight of this liquor, and many of them being ſo ſtrongly impregnated, that the workmen are obliged to let them down or lower them, by mixing them with a large quantity of ſea or common water, before they are fit to be boiled for the ſalt: the common run of ſea-water does not hold ſo much as one fourth part of this quantity, ſome not one eighth of it.

The ſalt produced from the ſea-water of all parts of the world, and from the brine of all the ſprings in the world, is abſolutely the ſame; but differs in ſtrength, and ſome other qualities, according to the operation by which it is made. In general, the quicker the liquor is evaporated, the weaker is the ſalt; the more time is employed in the proceſs, the ſtronger. This is not wonderful, when we conſider, that, over a gentle heat, water alone, or almoſt alone, evaporates from the liquor, but, over a more violent fire, a part of the ſtrength or acid of the ſalt is raiſed with it.

It is upon this principle, and owing to this cauſe, that we find the ſalt of our ſalt ſprings, which is uſually ſold us under the name of baſket-ſalt, the weakeſt of all. It is not that there is any difference in the waters from which theſe ſeveral kinds of ſalt are produced, that they appear to us in different degrees of ſtrength, but that the people who work the brine pits, make the ſalt with leſs expence of the workman's time; that the ſea-ſalt is formed over ſomewhat ſlower fires, and that the bay-ſalt is made only by the ſun's heat, where the proceſs is very long, and the heat very moderate, and the ſalt is found ſtrong in proportion. This is ſo indiſputable a truth, that once every week, a very ſtrong ſalt, little inferior to bay-ſalt in that quality, is made at the brine-pit works, where the common run of the ſalt is the weakeſt in the world. The liquor is the ſame in this caſe, but the workmen, who do not work on Sundays, leave a pan full to evaporate ſlowly over the fire, which they prepare on the Saturday night, and the moderate heat and length of time under which this weekly parcel of ſalt is made, render it very different from the common ſalt of the works, both in form and qualities; it is found to be made up of large and hard grains, inſtead of the ſmall and ſoft ones of the common kind, and is vaſtly ſuperior to it in ſtrength.

This circumſtance, overlooked by the workmen, and even by their maſters too, for many years, gave the hint to Mr. Lownds, and afterwards to the very ingenious Dr. Browning, author of an excellent treatiſe on this ſubject, to propoſe to the government a method of making a ſtrong ſalt fit for all the purpoſes for which we buy it of our neighbours, only by a new, that is, by a ſlower way of working our own brines. The latter of theſe gentlemen has proved, inconteſtibly, that we may, if we will encourage proper manufactures, have common ſalt of every kind made at home, equal in ſtrength, and equally fit for all purpoſes, with the ſalt of any part of the world.

Phyſicians are of opinion, that ſea-ſalt has the ſame effects in the human body that it has out of it, in checking fermentation, and preventing putrifaction; they therefore eſteem it of good uſe mixed with the generality of our foods in the ſtomach;

they are of opinion alſo, that it carries its effect into the blood, and has the qualities of a moderate dryer, detergent and attenuant, added to thoſe of a ſtimulant, which common reaſon declares it to be. Hence may be deduced all the virtues attributed to ſalt, as an aperient, ſtomachic, or warming medicine, and a provocative to venery; but in what degree it poſſeſſes all theſe qualities, we are, by its univerſal uſe in foods, prevented from being able to determine. Van Helmont recommends it as a good preſervative againſt the ſtone and gravel: he has been ſeverely cenſured for this by others, who are of opinion, that all ſalted foods, ſuch as ſalt beef, and the like, are very bad in thoſe caſes: but both parties may be in the right; for there is a great deal of difference between common ſalt eaten with the freſh juices of our food, and the brine and pickle into which it runs in the time of its being left upon the meat preſerved by it. Salt is very properly put into the mouths of people in apoplectic fits, as it not only irritates but attenuates the juices there, and promotes a diſcharge of them; and in a palſy which affects the tongue, a ſage leaf, bruiſed and covered with ſalt, has been a famous remedy among the good women, and not without reaſon.

Mixed with bran, and heated in a canvas bag, it is recommended to be applied externally to the head in head-achs, ariſing from a moiſt cauſe, and in defluctions: and we find the old phyſicians very ſtrenuouſly recommending a cataplaſm made of the ſame ingredients for pains.

Methods of making alimentary SALT are theſe. 1. By the evaporation of the ſun's rays: this is the moſt eaſy and ſimple method of all, when the waters of ponds and lakes, whether natural or artificial, impregnated with ſalt, being wholly exhaled by the force of the ſun and air, the ſalt is left concreted into a hard cruſt at the bottom of the lake, and is what commonly goes by the name of bay-ſalt; the cryſtals of which differ in ſize, according to the different degrees of heat, and the time it lies in the pits. All bay-ſalt has ſome mud, ſlime, or the like, in the making, and ſome kinds are mixed with the bittern ſalt, or what is called Epſom ſalt; they are all more white while dry, and more pellucid when moiſt, and they differ in colour, according to the earth which makes the bottom of the pits. Thus ſome of the French bay-ſalt is grey, ſome reddiſh, and ſome white, according as a blue clay has lined the pits, or a red, or white one. Some kinds have alſo an agreeable ſmell in large heaps; ſuch are the Portugal, and the Hampſhire bay-ſalts; and this ſeems owing to the ſea-water they were made from, having a bituminous matter in it. It differs alſo greatly in taſte, according to the various foreign mixtures it contains; and it will often alter in taſte, and other qualities, by long keeping: for, in general, it is much fitter for uſe, after it has been kept ſome time in a dry place, than when it is firſt made.

2. By boiling or coction; the moſt convenient works for which proceſs are conſtructed in the following manner: the ſaltern or boiling-houſe, is erected near the ſea ſhore, and is furniſhed with a furnace and one or two large pans, which are commonly made of iron plates, joined together with nails, and the joints filled with a ſtrong cement; and the bottoms of the pans are prevented from bending down, by being ſupported by ſtrong iron-bars.

The ſalt-pan being filled with ſea-water, a ſtrong fire of pit-coal is lighted in the furnace, and then, for a pan which contains about fourteen hundred gallons, the ſalt-boiler takes the whites of three eggs, and incorporates them all with two or three gallons of ſea-water, which he pours into the ſalt-pan, while the water contained therein is only luke-warm, and mixes this with the reſt by ſtirring it about with a rake. In many places they uſe, inſtead of eggs, the blood of ſheep or oxen to clarify the ſea-water; and in Scotland they do not give themſelves the trouble to clarify it at all. As the water heats, there ariſes a black frothy ſcum upon it, which is to be taken off with wooden ſkimmers. After this the water appears perfectly clear; and by boiling it briſkly about four hours, a pan loaded in the common way, that is about fifteen inches deep, will begin to form cryſtals upon its ſurface. The pan is then filled up a ſecond time with freſh ſea-water; and about the time when it is half filled, the ſcratch-pans are taken out and emptied of a white powder, ſeeming a kind of calcarious earth, which ſeparates itſelf from the ſea-water, during its boiling, before the ſalt begins to ſhoot. When theſe have been emptied, they are again put into their places, where they are afterwards filled again. This powder being violently agitated by the boiling liquor, does not ſubſide till it comes to the corners of the pan, where the motion of the maſs is ſmaller, and it there falls into theſe pans placed on purpoſe to receive it.

The ſecond filling of the pan is boiled down after clarifying in the ſame manner as the firſt, and ſo a third and a fourth; but in the evaporation of the fourth, when the cryſtals begin to form themſelves, they ſlacken the fire, and only keep the liquor ſimmering. In this heat they keep it all the while the ſalt is granulating, which is nine or ten hours. The granules or cryſtals all fall to the bottom of the pan; and when the water is almoſt all evaporated, and the ſalt lies nearly dry at the bottom, they rake it altogether into a long heap on one ſide of the pan, where it lies a while to drain from the brine, and then is put into barrows and carried to the ſtore-houſe, and delivered into the cuſtody of his majeſty's officers. In this manner the whole proceſs is

is performed in twenty-four hours, the ſalt being commonly drawn out every morning. This is the method in moſt of our ſalt-works, but in ſome they fill the pan ſeven times before they boil up the ſalt, and ſo take it out but once in two days, or five times in a fortnight. In the common way of four boilings, a pan of the uſual ſize, containing one thouſand three hundred gallons, they draw from fifteen to twenty buſhels of ſalt every day, each buſhel weighing fifty-ſix pounds.

When the ſalt is carried into the ſtore-houſe, it is put into drabs, which are partitions, like ſtalls for horſes, lined at three ſides and at the bottom with boards, and having a ſliding board on the fore-ſide to draw up on occaſion. The bottoms are made ſhelving, being higheſt at the back and gradually inclining forward; by this means, the brine remaining among the ſalt, eaſily ſeparates and runs from it, and the ſalt, in three or four days, becomes ſufficiently dry; in ſome places they uſe cribs and barrows, which are long and conic wicker baſkets, for this purpoſe; and in ſome places, wooden troughs with holes at the bottom. The ſaline liquor, which remains from the making of ſalt, is what is called bittern. See the article BITTERN.

Much in the ſame manner is the ſalt obtained from the brine of ſalt ſprings, pits, &c. White ſalt is prepared from ſea-water, or any other kind of ſalt-water, firſt heightened into a ſtrong brine by the heat of the ſun and the operation of the air. It may alſo be prepared from a ſtrong brine, or lixivium, drawn from earths, ſtones, or ſands, ſtrongly impregnated with common ſalt.

Refined rock-ſalt is that obtained by diſſolving foſſile or rock ſalt in ſalt of freſh water, and afterwards boiling the ſolution. And, laſtly, ſalt upon ſalt is made from bay-ſalt diſſolved in ſea-water, or other water, and boiled to a white-ſalt.

SALT, in chemiſtry, makes one of the leading and moſt active principles, or elements, procurable from mixed bodies.

There are three kinds thus obtained, two whereof are volatile, and the third fixed.

The volatile, are acrid and urinous ſalts; the fixed, lixivious, or thoſe drawn from aſhes: the urinous and lixivious ſalts are alſo called alkalies, or alkalious ſalts; the former being volatile, and the latter fixed.

SALT-PETRE, the ſame with nitre. See the article NITRE.

SALT-WORT, *Salicornia*, in botany. See the article SALICORNIA.

SALTIER, in heraldry, an ordinary in form of a St. Andrew's croſs; which may be ſaid to be compoſed of a bend dexter and ſiniſter, croſſing each other in the center of the eſcutcheon.

SALVAGE-MONEY, a reward allowed by the civil and ſtatute law, for the ſaving of ſhips or goods from the danger of the ſeas, pirates, or enemies.

Where any ſhip is in danger of being ſtranded, or driven on ſhore, juſtices of the peace are to command the conſtables to aſſemble as many perſons as are neceſſary to preſerve it; and on its being preſerved by their means, the perſons aſſiſting therein, ſhall, in thirty days after, be paid a reaſonable reward for the ſalvage; otherwiſe, the ſhip or goods ſhall remain in the cuſtody of the officers of the cuſtoms, as a ſecurity for the ſame.

SALVATELLA, in anatomy, a branch of the axillary vein, which runs over the back of the hand towards the little-finger.

SALVIA, ſage, in botany, &c. See the article SAGE.

SALVINIA, or MARSILEA, in botany. See the article MARSILEA.

SALUTATION, the act of ſaluting, greeitng, or paying reſpect or reverence to any one.

There is a great variety in the forms of ſalutation. The Orientals ſalute by uncovering their feet, laying their hands on their breaſts, &c. In England, we ſalute by uncovering the head, bending the body, &c. The pope makes no reverence to any mortal, except the emperor, to whom he ſtoops a very little, when he permits him to kiſs his lips.

SAMARITANS, an ancient ſect among the Jews, ſtill ſubſiſting in ſome parts of the Levant, under the ſame name.

Its origin was in the time of Rehoboam, under whoſe reign the people of Iſrael were divided into two diſtinct kingdoms, that of Judah and that of Iſrael; when the capital of the latter being Samaria, the Iſraelites obtained the name of Samaritans.

They were anciently guilty of idolatry, and the Rabbins pretend, that they worſhipped the figure of a dove, on mount Gerizim; but the preſent Samaritans, who are but few in number, are far from being idolaters.

They celebrate the paſſover every year, on the fourteenth day of the firſt month, on mount Gerizim, and begin that feaſt with the ſacrifice appointed for that purpoſe in Exodus: they keep the ſabbath with all the rigour with which it is injoined in the book of Exodus, none among them ſtirring out of doors but to the ſynagogue: they ſacrifice no where but on mount Gerizim: they obſerve the feaſts of expiation, tabernacles, harveſt, &c. and never defer circumciſion beyond the eighth day: they never marry their nieces as the Jews do: have but one wife; and, in fine, do nothing but what is commanded in the law.

SAMARITAN MEDALS, ſome ancient medals in the cabinets of our antiquaries, the inſcriptions and legends of which are in Hebrew; but the character different from the Hebrew of our Bibles, which is the ſquare Hebrew, or Chaldee; from this charac-

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ter, and not from their being ſtruck by the Samaritans, they are denominated Samaritan.

SAMBUCUS, the elder, in botany, a genus of umbelliferous plants, the flower of which is monopetalous, of a concave rotated form, cut into five obtuſe ſegments, which are reflexed at their edges: the fruit is a roundiſh unilocular berry, containing three ſeeds, convex on one ſide and angulated on the other.

The common elder has a long woody whitiſh root, and the branches are large, round, and full of a white pith; they are green at firſt, but afterwards turn to a grey colour: the trunk is covered with a rough aſh-coloured bark, full of cracks; under which is the inner bark, of a green colour: the leaves are dentated on their edges, and grow five or ſix of them on a mid-rib, which is terminated by an odd one: the flowers come out in May or June from the tops of the branches, in large umbels, and are of a white colour; theſe are ſucceeded by green berries, which in autumn turn black and very full of juice.

The elder will grow in almoſt any ſoil and ſituation; it may be propagated by ſeeds, but the moſt common method of increaſing it is by cuttings or truncheons ſtuck in the ground.

The wood of elder is uſed as a ſubſtitute for box in ſeveral buſineſſes, and particularly for making workmen's rules, of the cheap ſort.

All the parts of this tree are uſed in medicine, and are generally known to have a purging and aperient quality; the inner bark is eſteemed good in dropſies, and is accounted a good antiſcorbutic; the leaves are outwardly applied in the piles and inflammations; the flowers are uſed inwardly to expel wind, and outwardly, in eryſipelatous inflammations, and arthritic ſwellings; the berries are eſteemed cordial, and uſeful in hyſteric diſorders, and are frequently put into gargariſms for ſore mouths and throats; the wine made from theſe berries, is ſo well known as to need no deſcription.

SAMBUCUS, is alſo an ancient muſical inſtrument of the wind kind, reſembling a flute; probably thus called, becauſe made of elder.

SAMIAN EARTH, in the materia medica, the name of two ſpecies of marl uſed in medicine, viz. 1. The white kind, called by the ancients, collyrium ſamium; being aſtringent, and therefore good in diarrhœas, dyſenteries, and hæmorrhages; they alſo uſed it externally in inflammations of all kinds. 2. The browniſh-white kind, called after ſamius, by Dioſcorides: this alſo ſtands recommended as an aſtringent. See the article MARL.

SAMOLUS, in botany, an annual plant, growing wild in watery places; the ſtalks riſe to about a foot in height, and are ſlender, round, and ſtiff, with the leaves placed alternately on them, without pedicles; the flowers grow on the tops of the ſtalks and branches, and conſiſt each of a monopetalous ſaucer-ſhaped corolla, with the limb divided into five plane obtuſe ſegments: the fruit is an ovate unilocular capſule, opening half way, with five valves, and containing a great many ovate ſmall ſeeds.

This plant is reckoned to be vulnerary, aperient, and cleanſing.

SAMOSATENIANS, in church hiſtory, the ſame with Paulianites. See the article PAULIANITES.

SAMPHIRE, *Crethmum*, in botany. See the article CRETHMUM.

SAMPSEANS, in church hiſtory, an ancient ſect, who were properly neither Jews, Chriſtians, nor Gentiles, though they took their name from the Hebrew word *Semes*, ſun; as though they worſhipped that planet.

They acknowledged only one God; waſhed themſelves often; and in almoſt every thing attached themſelves to the religion of the Jews: many among them abſtained wholly from eating of fleſh.

Scaliger will have the Sampſeans to be the ſame with the Eſſeni; and indeed the Sampſeans, Eſſeni, Elceſaites, and Maſſalians, appear to be no more than ſo many different names for the ſame ſect.

SAMYDA, in botany, a genus of plants, whoſe flower hath no corolla; the calyx is campanulated, coloured, ſpreading, and perſiſtent, including a nectarium formed of five ſcales: the fruit is a roundiſh unilocular capſule, filled with a pulp, and contains a number of baccated ſeeds.

SANAMUNDA, in botany, the ſame with the empetrum, or heath ſpurge. See the article EMPETRUM.

SANCTIFICATION, the act of ſanctifying, or rendering a thing holy.

The reformed divines define ſanctification to be an act of God's grace, by which a perſon's deſires and affections are alienated from the world, and by which he is made to die to ſin, and to live to righteouſneſs; or, in other words, to feel an abhorrence of all vice, and a love of virtue and religion.

SANCTION, the authority given to a judicial act, by which it becomes legal and authentic.

SANCTUARY, among the Jews, alſo called ſanctum ſanctorum, or holy of holies, was the holieſt and moſt retired part of the temple of Jeruſalem, in which the ark of the covenant was preſerved, and into which none but the high-prieſt was allowed to enter, and that only once a year, to intercede for the people.

Some diſtinguiſh the ſanctuary from the ſanctum ſanctorum, and maintain that the whole temple was the ſactuary.

SANCTUARY, in our ancient cuſtoms, is the ſame with aſylum. See the article ASYLUM.

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SANCTUARY, in the Romiſh church, is alſo uſed for that part of the church in which the altar is placed, incompaſſed with a rail or balluſtrade.

SAND, *Arena*, in natural hiſtory, a genus of foſſils, the characters of which are, that they are found in minute concretions; forming together a kind of powder, the genuine particles of which are all of a tendency to one determinate ſhape, and appear regular, though more or leſs complete concretions; not to be diſſolved or diſunited by water, or formed into a coherent maſs by means of it, but retaining their figure in it; tranſparent, vitrifiable by extreme heat, and not diſſoluble in, nor effervescing with, acids.

Sands are ſubject to be variouſly blended both with homogene and heterogene ſubſtances, as that of talcs, &c. and hence, as well as from their various colours, are ſubdivided into, 1. White ſands, whether pure or mixed with other arenaceous or heterogeneous particles; of all which there are ſeveral ſpecies, differing no leſs in the fineneſs of their particles, than in the different degrees of colour, from a bright and ſhining white, to a browniſh, yelloviſh, greeniſh, &c. white. 2. The red and reddiſh ſands, both pure and impure. 3. The yellow ſands, whether pure or mixed, are alſo very numerous. 4. The brown ſands, diſtinguiſhed in the ſame manner. 5. The black ſands, whereof there are only two ſpecies, viz. a fine, ſhining, greyiſh-black ſand, and another of a fine, ſhining, reddiſh-black colour. 6. The green kind, of which there is only one known ſpecies, viz. a courſe, variegated, duſky-green ſand, common in Virginia.

Sand is of great uſe in the glaſs manufacture; the white writing-ſand being employed for making the white glaſs, and a courſe greeniſh-looking ſand for the green glaſs.

In agriculture, the office of ſand ſeems to be to make unctuous earths fertile, and fit to ſupport vegetables, &c. for earth alone, we find, is liable to coaleſce, and gather into a hard coherent maſs, as appears in clay; and being thus embodied, and as it were glued together, is no way diſpoſed to nouriſh vegetables: but if ſuch earth be mixed with ſand, its pores are thereby kept open, and the earth itſelf looſe, ſo as thus to give room for the juices to aſcend, and for plants to be nouriſhed thereby.

A vegetable planted only in ſand, or in a fat glebe, or in earth, receives little growth or increaſe; but a mixture of both renders the maſs fertile. In effect, earth is in ſome meaſure made organical by means of ſand; pores and ſpaces, ſomething analogous to veſſels, being thereby maintained, by which the juices may be conveyed, prepared, digeſted, circulated, and at length diſcharged.

Common ſand is a very good addition, by way of manure, to all ſorts of clay lands; it warms them, and makes them more open and looſe.

The beſt ſand for the farmer's uſe, is that which is waſhed by rains from roads or hills, or that which is taken from the beds of rivers; the common ſand that is dug in pits never anſwers nearly ſo well. However, if mixed with dung, it is much better than laid on alone: and a very fine manure is made by covering the bottom of ſheep-folds with ſeveral loads of ſand every week, which are to be taken away, and laid on cold ſtiff lands, impregnated as they are with the dung and urine of the ſheep.

Beſide clay land, there is another ſort of ground very improveable by ſand; this is that ſort of black foggy land on which buſhes and ſedge grow naturally, and which they cut into turf in ſome places.

Six hundred load of ſand being laid upon an acre of this land, according to the Cheſhire meaſure, which is near double the ſtatute acre, meliorate it ſo much, that without plowing, it will yield good crops of oats or tares, though before it would have produced ſcarce any thing. If this crop is taken off, the land well dunged, and laid down for graſs, it will yield a large crop of ſweet hay.

Once ſanding this land will improve it for a vaſt number of years, and it will yield two crops of hay in the year, if there be weather to make it in. Some land in Cheſhire has been, by this means, rendered of twelve times its former value to the owner.

The bogs of Ireland, when drained, have been rendered very fruitful land, by mixing ſand in this manner among the earth, of which they conſiſt. Add to this, that in all theſe boggy lands, the burning them, or firing their own turf upon them, is alſo a great advantage.

The common peat or turf aſhes, mixed with the ſand for theſe purpoſes, add greatly to its virtue.

Sea-ſand, which is thrown up in creeks and other places, is by much the richeſt of all ſand for manuring the earth; partly its ſaltneſs, and partly the fat and unctuous filth that is mixed among it, give it this great virtue. In the weſtern parts of England, that lie upon the ſea-coaſt, they make very great advantages of it. The fragments of ſea-ſhells, alſo, which are always in great abundance in this ſand, add to its virtues; and it is always the more eſteemed by the farmers, the more of theſe fragments there are among it.

That ſea ſand is accounted the beſt, which is of a reddiſh colour: the next in value to this, is the bluiſh; and the white is the worſt of all. Sea ſand is beſt when taken up from under the water, or from ſand-banks which are covered by every tide. The ſmall-grained ſand is moſt ſudden in its operation, and is therefore beſt for the tenant, who is only to take three or four crops; but the coarſe, or large-grained ſand, is much better for the landlord, as the good it does, laſts for many years. When the land has been well manured with the large ſand,

they take four crops of corn from it, and then lay it down for paſture, for ſix or ſeven years before they plough it again.

The graſs is ſo good, that they commonly mow it for hay the firſt year; it always abounds very much with the white-flowered clover. If the graſs grows but ſhort, it is the farmer's intereſt to feed his cattle upon it, and it will turn to as good account this way, being very ſweet and rich, and making the cattle fat, and the cows yield a very large quantity of milk.

SAND-BAGS, in the art of war, are bags filled with ſand or earth, holding each about a cubic foot: their uſe is to raiſe parapets in haſte, or to repair what is beaten down.

SAND-BOX-TREE, *Hura*, in botany. See the article HURA.

SAND-FLOOD, a terrible miſchief, incident to the lands of Suffolk, and ſome other parts of England; which are frequently covered with vaſt quantities of ſand, rolling in upon them like a deluge of water, from ſandy hills in their neighbourhood.

The beſt way of ſtopping its progreſs, is by hedges of furze, planted one over another as they become level.

SAND-LANDS, or SANDY-LANDS, in agriculture, are made up of ſand of different colours and qualities; as white, blackiſh, reddiſh, or yellowiſh; and in the ſize of their particles, ſome being milder or harſher, and others very light, ſeeming mere duſt. The grey, black, and aſh-coloured ſands, are the worſt of all, and are generally found on heaths and commons.

The moſt ſuitable plants for arable lands of this kind, are white oats, rye, black wheat, and turneps: the natural produce in weeds, is quick-graſs, ſorrel, broom, furze, fern, and heath.

The beſt manure for them, is either marl, or ſuch clay as will break with the froſts. Cow-dung is alſo ſaid to be good for ſuch lands; and many uſe with ſucceſs, chalk, mud, and the half-rotten ſtraw of dunghills.

SANDAL, in antiquity, a rich kind of ſlipper, worn on the feet by the Greek and Roman ladies, made of gold, ſilk, or other precious ſtuff, conſiſting of a ſole, with a hollow at one extreme to embrace the ancle, but leaving the upper part of the foot bare.

It is alſo the name of a ſhoe or ſlipper worn by the pope, and other Romiſh prelates, when they officiate.

SANDARACH, in natural hiſtory, a very beautiful native foſſil, though too often confounded with the common factitious red arſenic, and with the red matter formed by melting the common yellow orpiment.

It is a pure ſubſtance, of a very even and regular ſtructure, is throughout of that colour which our dyers term an orange-ſcarlet, and is conſiderably tranſparent, even in the thickeſt pieces. But though, with reſpect to colour, it has the advantage of cinnabar while in the maſs, it is vaſtly inferior to it when both are reduced to powders. It is moderately hard, and remarkably heavy, and when expoſed to a moderate heat, melts and flows like oil: if ſet on fire, burns very briſkly.

It is found in Saxony and Bohemia, in the copper and ſilver mines, and is ſold to the painters, who find it a very fine and valuable red: but its virtues or qualities in medicine, are no more aſcertained at this time, than thoſe of the yellow orpiment.

Gum-SANDARACH, is a dry and hard reſin, uſually met with in looſe granules, of the bigneſs of a pea, a horſe-bean, or larger; of a pale whitiſh yellow, tranſparent, and of a reſinous ſmell, brittle, very inflammable, of an acrid and aromatic taſte, and diffuſing a very pleaſant ſmell when burning. It is produced from a ſpecies of the juniper, and the cedrus baccifera. See JUNIPER.

It flows only from theſe trees in hot countries; but the natives promote its diſcharge by making inciſions in the bark.

What is obtained from the cedar is more fragrant, eſpecially when burnt; but it is ſeldom to be met with ſeparate in the ſhops, both being mixed together under the common name of ſandarach.

Sandarach is good in diarrhœas, and in hæmorrhages; where its doſe is from ten grains to half a dram: it is alſo ſometimes preſcribed in gonorrhœas, and the fluor albus; but at preſent it is much diſuſed in medicine. It is, however, much uſed by our writing-maſters, who make a powder of it, which they call pounce.

The varniſh-makers make a kind of varniſh of it by diſſolving it in oil of turpentine, or linſeed, or in ſpirit of wine.

SANDIVER, a whitiſh ſalt, continually caſt up from the metal, as it is called, whereof glaſs is made; and ſwimming on its ſurface, is ſkimmed off. See the article GLASS.

SANDIX, a kind of minium, or red-lead, made of ceruſe; but much inferior to the true minium.

SANGUIFICATION, in the animal œconomy, the converſion of chyle into true blood. See the articles CHYLE, CHYLIFICATION, and BLOOD.

Blood is formed from chyle by various and ſucceſſive degrees. A few hours after meals, the chyle is found conveyed into the blood, though not aſſimilated. Hence, when after a liberal meal, blood is taken from the vein, beſides the ſerum and the red part, there is a white, ſweet, and chylous part found fluctuating in the blood. In a few hours the chyle, conveyed with the blood through the veſſels, is ſeparated from the blood by the fabric of the breaſts, and affords milk, which is of a different nature both from blood and chyle; for in milk there begins to be formed that tendency to concretion.

tion which is already preſent in the ſerum of the blood, for it yields cheeſe. But this tendency to concretion is never found in the chyle. Hence we may artificially imitate the preparation of chyle in emulſions, but never the nature of milk.

When a ſound women for twelve hours totally abſtains from meat and drink, her milk begins to be ſaline and yellowiſh. If ſhe abſtains ſtill longer, nothing is found in the blood taken from her veins, but what (like the white of an egg) is by means of the fire concreted, which never happens in the chyle.

Hence we may conclude, that the bodies of ſound perſons are the formers and producers of their own blood, in the ſame manner as any plant, by its peculiar fabric, prepares its ſap from the juices of the fertile earth and the genial influences of the circumambient air.

But in the human body the formation of blood depends principally upon the efficacy of the circulation, by which the veſſels act upon their contained fluids. Hence in the moſt robuſt perſons the blood is reddeſt, or rather almoſt black, in conſequence of its ſaturated red colour, and is concreted almoſt the very moment it is left in a ſtate of reſt. And in acute diſeaſes, when the circulation is increaſed, all the parts are intenſely red, and the ſerum of the blood is converted into a ſciſſile maſs. But in weak perſons, in whom the efficacy of the circulation is far leſs, all the parts are pale and languid, whilſt the blood is thin and hardly capable of concretion. But when in ſuch perſons, with due exerciſe and proper remedies, the circulation is augmented, the red colour and due coheſion of the blood return.

SANGUINARIA, in botany, a genus of plants, whoſe flower conſiſts of eight oblong, obtuſe, ſpreading petals, with a great number of ſtamina. The fruit is an oblong ventricoſe capſule, with two valves pointed at both ends, and contains a great many roundiſh acuminated ſeeds.

SANGUINE, in general, ſomething abounding with, or reſembling blood. See the article BLOOD.

Among heralds, the term ſanguine is often given to the colour more uſually called murrey; being made of red lake tinged with a little Spaniſh brown; it is chiefly uſed in the coats of the knights of the Bath, and is repreſented, in engraving, by hatches like thoſe of purpure. See the articles PURPURE and HATCHES.

SANGUIS, blood, in the animal œconomy. See the article BLOOD.

SANGUISORBA, in botany, a genus of plants, whoſe flower is monopetalous, rotated, and divided into four deep ſegments, cohering at their baſe; the ſtamina are four filaments the length of the corolla, and topped with ſmall roundiſh antheræ: the fruit is a ſmall bilocular capſule, which is filled with ſmall ſeeds.

SANHEDRIM, or SANHEDRIN, among the Jews, the great council of the nation, conſiſting of ſeventy ſenators, taken partly from among the prieſts and levites, and partly out of the inferior judges, who formed what was called the leſſer ſanhedrim. The room they met in, was a rotunda, half of which was built without the temple, and half within. The naſi, or preſident of the ſanhedrim, ſat upon a throne, with his deputy on his right hand, his ſub-deputy on his left, and the other ſenators ranged in order on each ſide.

The authority of this council was very extenſive, for they decided ſuch cauſes as were brought before them by way of appeal from the inferior courts; and the king, the high-prieſts, and prophets were under the juriſdiction of this tribunal. They had the right of judging in capital caſes, and ſentence of death might not be pronounced in any other place; for which reaſon the Jews were forced to quit this hall, when the power of life and death was taken out of their hands, forty years before the deſtruction of the temple, and three years before the death of Chriſt.

There were ſeveral inferior ſanhedrims in Paleſtine, each of which conſiſted of twenty-three perſons; all theſe depended on the great ſanhedrim of Jeruſalem.

SANICLE, *Sanicula*, in botany, an umbelliferous plant, which ſends forth ſeveral broad, roundiſh leaves, that are ſmooth, dentated on their edges, and of a fine green ſhining colour; from among theſe ariſes a ſtalk to the height of a foot, ſmooth, without knots, and reddiſh towards the root; on the top are ſeveral ſmall flowers, collected into an umbel, each particular one conſiſts of five compreſſed and bifid petals. The fruit is compoſed of two ſeeds, plane on one ſide, and convex and ſcabrous on the other. This plant flowers in June, and grows wild in woods and ſhady places in moſt parts of England: the leaves have been long noted for their vulnerary virtues both internally and externally, and may be uſed in the manner of tea.

SANIES, in medicine, a ſerous putrid matter, iſſuing from wounds; it differs from pus, which is thicker and whiter.

SANTALUM, ſaunders, in the materia medica, a hard, odoriferous medicinal wood, brought from the Eaſt-Indies, of which there are three ſorts, viz. the yellow, white, and red: the yellow or citrine ſaunders, is a beautiful wood, of the colour of lemon-peel, of a ſmell ſomewhat like a mixture of muſk and roſes, and of a ſomewhat acrid and aromatic taſte, with a ſlight bitterneſs. The white ſaunders reſembles the yellow, and is of the ſame fragrant ſmell and aromatic taſte, but in a more remiſs degree. Both theſe ſorts ſhould be choſen ſound, firm, heavy, and of a good ſmell when cut; they ſhould alſo be choſen in the block, and not

cut

cut into chips as they usually are; for in this manner they soon lose much of their virtue. The red saunders is of a dense and compact texture, remarkably heavy and very hard. It is brought to us in logs of considerable length, the outer part of which is of a dusky colour, and the inner of a blood red; it has but little smell, and it is of an austere taste.

All these sorts are attenuants, and all have an astringency, but the red most of all. They are accounted cordials, and are said to be good in obstructions of the viscera; but they are little used, except as ingredients in some of the compositions of the shops.

Santalum is a plant of the octandria-monogynia class, with a monopetalous campanulated flower, and a berry for its fruit.

SANTOLINA, lavender-cotton, in botany, a genus of plants, whose flower is compound and uniform, with an hemispherical scaly cup; the proper flowers are hermaphrodite, funnel-shaped, and quinquifid at the limb; there is no pericarpium, but the cup contains solitary, oblong, four-cornered seeds, placed on a paleaceous receptacle. The common lavender-cotton has a thick, hard, woody root, from which proceed a shrubby stalk, dividing into many woody branches, which are furnished with slender leaves about an inch long, which are four ways denticulated, they are of a hoary colour, and have a rank strong smell with somewhat of a sweetness, the taste is partly acrid and partly of an aromatic bitter; the branches are terminated by single yellow flowers which appear in July. This plant is cultivated in gardens, and may be propagated by planting slips or cuttings of it in the spring. The leaves, and sometimes the flowers, are used in medicine, and are reputed good to destroy worms.

SAP, in physiology, a juice furnished by the earth, and changed into the plant, consisting of fossil parts, other parts derived from the air and rain, and others from putrified animals, plants, &c. See the article JUICE.

This juice enters the plant in form of a fine and subtile water, which the nearer it is to the root, the more it retains of its proper nature: and the farther from the root, and the more action it has sustained, the nearer it approaches to the nature of the vegetable; consequently, when the juice enters the root, it is earthy, watery, poor, acid, and scarcely oleaginous at all. In the trunk and branches it is farther prepared, though it still continues acid, as we find by tapping a tree in the month of February.

The sap being here carried to the germs or buds, is more concocted; and here having unfolded the leaves, these come to serve as lungs for the circulation and farther preparation of the juice. By such means is the sap still farther altered and digested, as it is farther in the petals or leaves of the flowers, which transmit the juice, now brought to a farther subtility, to the stamina; these communicate it to the farina, or dust, in the apices, which is, as it were, the male seed of the plant; where, having undergone a farther maturation, it is shed into the pistil, which performs the office of an uterus or womb; and thus having acquired its last perfection, it gives rise to a new fruit or plant. The sap having thus gone its stage, from the root to the remote branches, and even the flower; and having, in every part of its progress, deposited something both for aliment and defence, what is redundant passes out into the bark, the vessels of which are inosculated with those in which the sap mounts; and through which it descends to the root, and thence to the earth again. And thus a circulation is affected.

SAP, or SAPP, in the art of war, is the digging deep under the earth of the glacis, in order to open a covered passage into the mote. It is only a deep trench, covered at top with boards, hurdles, earth, sand-bags, &c. and is usually begun five or six fathoms from the saliant angle of the glacis.

SAPINDUS, n botany, the sopeberry-tree; it grows naturally in the West Indian islands, where it rises with a woody stalk twenty or thirty feet high, sending out many branches towards the top, which are furnished with winged leaves composed of three, four, or five pair of lobes of a lanceolated form, drawing to points at both ends, the mid-rib has a membranaceous border running on each side; the flowers are produced in loose spikes at the ends of the branches; they are small, white, and consist each of four oval petals less than the cup, with eight stamina. The fruit is three globose inflated capsules, including in each a round nut. The berries of this tree are used for washing instead of soap, but it is very detrimental to linen if often used, being of an acrid nature.

SAPONARIA, sopewort, in botany, a genus of plants, whose flower consists of five petals, whose ungues are narrow, angulated, and the length of the cup, and the borders are plane, obtuse, and broad; the stamina are ten subulated filaments, terminated with obtuse, oblong, incumbent antheræ. The fruit is a close unilocular capsule the length of the cup, and contains a number of small seeds.

The common sopewort is accounted opening and attenuating, and somewhat sudorific; it is of service in asthmas and all disorders of the breast which require expectoration; outwardly likewise it is commended for discussing and suppurating tumours.

The leaves agitated with water raise a saponaceous froth, which has nearly the same effect in taking out dirt or spots in cloths as sope, whence the name.

SAPOTA, in botany, a genus of trees, whose flower consists of five roundish cordated petals, which are connected at their base, and five short filaments terminated with arrow pointed antheræ. The fruit is

is oval and ſucculent, and contains one or two nuts.

SAPPHIRE, a pellucid gem, which, in its fineſt ſtate, is extremely beautiful and valuable, and ſecond only to the diamond in luſtre, hardneſs, and price. Its proper colour is a pure blue; in the fineſt ſpecimens it is of the deepeſt azure, and in others varies into paleneſs in ſhades of all degrees between that and a pure cryſtal brightneſs and water, without the leaſt tinge of colour, but with a luſtre much ſuperior to the cryſtal. They are diſtinguiſhed into four ſorts, viz. the blue ſapphire, the white ſapphire, the water ſapphire, and the milk ſapphire.

The gem known to us by this name is extremely different from the ſapphire of the ancients, which was only a ſemi-opake ſtone, of a deep blue, veined with white, and ſpotted with ſmall gold-coloured ſpangles, in the form of ſtars, and was only a more beautiful kind of the lapis lazuli; but our ſapphire they have deſcribed under the name of beryllus æroides, or the ſky-blue beryl.

The fineſt ſapphires in the world are brought from the kingdom of Pegu, in the Eaſt-Indies, where ſome are found perfectly colourleſs, and others of all the ſhades of blue: theſe are all found in the pebble form. We have very fine ſapphires alſo, partly pebble, partly cryſtal-ſhaped, from Biſnagar, Conanor, Calicut, and the iſland of Ceylon: theſe alſo are of all the ſhades of blue. And in Ceylon there are ſometimes found a ſort of baſtard gems, of a mixed nature between the ſapphire and ruby. The occidental are from Sileſia, Bohemia, and many other parts of Europe; but though theſe are often very beautiful ſtones, they are greatly inferior, both in luſtre and hardneſs, to the oriental.

The ſapphire is ſaid to have very great virtues as a cordial, ſudorific, and alexipharmic; but we have no good teſtimony of any body's having ever found this by experiment.

For the manner of making counterfeit ſapphires, ſee GEMS ARTIFICIAL.

SAPPHARINE WATER, in the materia medica, alſo called blue eye-water, is thus prepared: pour a pint of lime-water, made ſtrong and freſh, into a copper-veſſel, add to it a dram of ſal armoniac, and throw in ſome filings or ſmall pieces of copper, and let it ſtand till it has acquired a beautiful colour.

This is uſed as an eye-water; as alſo to deterge old ulcers: and ſometimes it is mixed with other things in injections in gonorrhœas.

SARABAITES, a ſort of monks among the ancient Chriſtians, who did not reſort to the wilderneſs as others did, but lived publicly in cities. Two or three of them uſually dwelt together, but they had no rule or government; they however obſerved very ſtrict faſts; wore looſe ſleeves, wide ſtockings, coarſe cloaths, frequently ſighed, and always bitterly inveighed againſt the clergy.

SARABRAND, a muſical compoſition in triple time, the motions of which are ſlow and ſerious.

The ſarabrand is ſaid to be originally derived from the Saracens, and is uſually danced to the ſound of the guitar or caſtanettes.

SARCASM, in rhetoric, a keen bitter expreſſion which has the true point of ſatire, by which the orator ſcoffs and inſults his enemy: ſuch was that of the Jews to our Saviour, He ſaved others, himſelf he cannot ſave.

SARCOCELE, in ſurgery, a ſpurious rupture, or hernia, wherein the teſticle is conſiderably tumified or indurated, like a ſcirrhus, or much enlarged by a fleſhy excreſcence, which is frequently attended with acute pains, and ſometimes ulceration, ſo as to degenerate at laſt into a cancerous diſpoſition. See HERNIA.

SARCOCOLLA, in pharmacy, a gum-reſin, which approaches greatly to the nature of the ſimple gums.

It is brought to us from Perſia and Arabia, in ſmall granules, moderately heavy, and of a whitiſh, browniſh, or reddiſh colour, very friable, of a faintiſh diſagreeable ſmell, and of an acrid and nauſeous taſte.

Hoffman abſolutely condemns the internal uſe of it. However, it is recommended in ophthalmics, and defluctions of a ſharp matter upon the eyes; and is generally ordered to be diſſolved in milk for this purpoſe.

SARCOLOGY, is that part of anatomy which treats of the ſoft parts, viz. the muſcles, inteſtines, arteries, veins, nerves, and fat. See MUSCLES, INTESTINES, &c.

SARCOMA, in ſurgery, denotes any fleſhy excreſcence. See EXCRESCENCE.

Sarcomata of the noſe, eyes, &c. may be ſometimes removed by cauſtics; but the extirpating them with the knife or ſciſſars is the ſafeſt and moſt eligible method. The wound ſhould be ſuffered to bleed a while, after which it may be waſhed with a collyrium made of aloes, tutty, and ſugar of lead, mixed in roſe-water.

SARCOPHAGOUS MEDICINES, in ſurgery, &c. are thoſe which eat away proud fleſh, and otherwiſe called cauſtics. See the article CAUSTIC.

SARCOTICS, in ſurgery, medicines which generate fleſh in wounds. See the articles WOUND and VULNERARIES.

SARDONYX, in natural hiſtory, a genus of ſemi-pellucid gems, of the onyx-ſtructure, zoned or tabulated, and compoſed of the matter of the onyx variegated with that of the red or yellow carnelian.

Of this ſtone there are ſeveral beautiful ſpecies; as, 1. The thin zoned red ſardonyx; or whitiſh onyx with thin ſnow-white and red zones. 2. The broad zoned red ſardonyx; or horny onyx, with punctuated zones. 3. The horny onyx, with

whitiſh and yellow zones; and is properly the yellow ſardonyx and the chryſolite onyx of the ancients. 4. The orange-coloured ſardonyx; or bluiſh-white onyx, with orange-coloured and whitiſh zones.

SAROTHRA, in botany, a genus of plants, whoſe flower conſiſts of five petals, of an obtuſe, lanceolate, linear form, with five ſlender filaments topped with roundiſh antheræ: the fruit is an oblong, acute, unilocular capſule, which is coloured, having three valves, and contains a great number of ſmall kidney-ſhaped ſeeds.

SARRACENIA, in botany, a genus of aquatic plants, whoſe flower-cup is double; the corolla conſiſts of five ovate inflexed petals, with a great number of ſmall ſtamina. The fruit is a roundiſh quinquelocular capſule, containing a number of ſmall acuminated roundiſh ſeeds.

The plants of this genus are natives of North-America, and are much eſteemed for the ſingular ſtructure of their leaves and flowers, which are ſo very different from all others, as to have very little reſemblance to thoſe yet diſcovered.

SARRASIN, or SARRAZIN, in fortification, the ſame with herſe. See the article HERSE.

SARSAPARILLA, in pharmacy, the root of the rough ſmilax of Peru, conſiſting of a great number of long ſtrings hanging from one head: theſe long roots, the only parts made uſe of, are about the thickneſs of a gooſe-quill, or thicker, flexible, and compoſed of fibres running their whole length: they have a bitteriſh but not ungrateful taſte, and no ſmell: and as to their medicinal virtues, they are ſudorific and attenuant, and ſhould be given in decoction, or by way of diet-drink.

SARTORIUS, in anatomy, is both an abductor and an elevator, ſerving to move the legs upward and forward, determining them to croſs each other, as taylors ſit with them, whence the name; it riſes from the internal part of the anterior and ſuperior ſpine of the ileum; and deſcending obliquely, is inſerted into the upper and inner part of the tibia.

SASSAFRAS-TREE, in botany, a ſpecies of laurus; it grows in many parts of North-America, where it riſes to the height of eight or ten feet; the branches are furniſhed with leaves about four inches long and three broad; others are deeply divided into three lobes, which are ſix inches long, and placed alternately upon pretty long foot-ſtalks; they are of a lucid green, and fall off in autumn: the flowers appear juſt below them, upon ſlender foot-ſtalks, each ſuſtaining three or four ſmall yellow flowers, which are each ſucceeded by a ſmall oval berry, which when ripe is of a blue colour.

Saſſafras is imported in large ſquare blocks; it is ſaid to be warm, aperient, and corroborant, and frequently employed with good ſucceſs for purifying and ſweetening the blood and juices; for which purpoſe an infuſion, in the way of tea, is a very pleaſant drink; and is a principal ingredient in the liquor called ſalop; the oil is very fragrant, and poſſeſſes moſt of the virtues of the wood.

SATELLITE, in aſtronomy, the ſame with a ſecondary planet, or moon; ſo called from its continually waiting upon or revolving round one of the primary planets. See the article PLANET.

SATISFACTION, in law, is the giving a recompence for ſome injury done; or the payment of money due on bond, judgment, &c.

SATRAPA, or SATRAPES, in Perſian antiquity, denotes an admiral; but more commonly the governor of a provence.

SATTIN, a gloſſy kind of ſilk ſtuff, the warp of which is very fine, and ſtands out ſo as to cover the coarſer woof.

Some ſattins are quite plane, others wrought; ſome flowered with gold or ſilver, and others ſtriped, &c.

The Chineſe ſattins are moſt valued, becauſe of their cleaning and bleaching eaſily, without loſing any thing of their luſtre: in other reſpects they are inferior to thoſe of Europe.

SATTINET, a ſlight thin kind of ſattin, commonly ſtriped, and chiefly uſed by the ladies for ſummer night-gowns.

SATURATION, in chemiſtry, is the impregnating an acid with an alkali, or vice verſa, till either will receive no more, and the mixture become neutral.

SATURDAY, the ſeventh or laſt day of the week, ſo called from the idol Seater, worſhipped on this day by the ancient Saxons, and thought to be the ſame as the Saturn of the Latins. Saturday anſwers to the Jewiſh ſabbath. See the article SABBATH.

SATUREGIA, ſavory, in botany. See the article SAVORY.

SATURN, ♄, in aſtronomy, the remoteſt of the ſuperior planets, which, by reaſon of its great diſtance from the ſun, ſhines but with a feeble light. See the article PLANET.

SATURN, in chemiſtry, &c. an appellation given to lead. See the article LEAD.

SATURN, in heraldry, denotes the black colour, in blazoning the arms of ſovereign princes. See BLAZONING.

SATURNALIA, in Roman antiquity, a feſtival obſerved about the middle of December, in honour of the god Saturn, whom Lucan introduces, giving an account of the ceremonies obſerved on this occaſion thus: "During my whole reign, which laſts but for one week, no public buſineſs is done; there is nothing but drinking, ſinging, playing, creating imaginary kings, placing ſervants with their maſters at table, &c. There ſhall be no diſputes, reproaches, &c. but the rich and poor, maſters and ſlaves, ſhall be equal," &c.

SATURNINE, an appellation given to perſons

of a melancholy diſpoſition, as being ſuppoſed under the influence of the planet Saturn.

SATYR, in the heathen mythology, a fabulous kind of a demi-god, or rural deity, of the ancient Romans, repreſented with goat's feet, and ſharp pricked up ears.

SATYR, or SATIRE, in matters of literature, a diſcourſe or poem, expoſing the vices and follies of mankind.

SATYRIUM, in botany, a genus of plants, whoſe flower conſiſts of five oval oblong petals, the three outer and two inner forming the ſhape of a helmet, with a monophyllous nectarium placed between the diviſion of the petals; the ſtamina are two ſhort ſlender filaments, placed on the piſtillum and terminated with oval antheræ, which have double cells incloſed in the upper-lip of the nectarium. The fruit is an unilocular, tricarinate, oblong capſule, containing a number of ſcabiform and very ſmall ſeeds.

SAUCISSE, or SAUSAGE, in the military art, a long train of powder, ſewed up in a roll of pitched cloth, about two inches in diameter, ſerving to ſet fire to the mines.

SAUCISSON, in fortification, a maſs of large branches of trees bound together; and differing only from a faſcine, as this is compoſed of ſmall branches of twigs. See the article FASCINE.

Sauceſſons are employed to cover the men, and to make epaulements.

SAVIN, *Sabina*, in botany, a plant which riſes to about three or four feet in height, the branches inclining to a horizontal direction, and furniſhed with ſhort pointed leaves, which have a diſagreeable ſmell and an acrid burning taſte: the flower and fruit are the ſame as the juniper, of which it is held a ſpecies by botaniſts. See the article JUNIPER.

Savin is a very powerful hyſteric, and ſo forcing, that, by ſome, it is put to the bad practice of procuring abortion; it is a great cleanſer, and therefore very good in all obſtructions of the viſcera, where a conſtitution can bear its efficacy; and for the ſame reaſon it has obtained, among ſurgeons, the uſe of cleaſing foul ulcers; it likewiſe is eſteemed of great ſervice againſt worms.

SAVIOUR, an appellation peculiarly given to Jeſus Chriſt, as being the true Meſſiah, and Saviour of the world. See the article MESSIAH.

Order of St. SAVIOUR, a religious order in the Romiſh church, founded by St. Bridget, about the year 1345; and ſo called, from its being pretended that our Saviour himſelf dictated to the foundreſs its conſtitutions and rules.

SAUNDERS, *Santalum*, in botany. See the article SANTALUM.

SAVORY, *Saturegia*, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is cylindraceous, and the chaps ſingle: there is no pericarpium, but the ſeeds, which are four and roundiſh, are contained in the bottom of the cup.

The ſummer-ſavory is cultivated in gardens, by ſowing the ſeeds in the ſpring, on a bed of light rich earth, and afterwards tranſplanted where they are intended to remain. The winter-ſavory may alſo be raiſed as the former, and alſo by ſlips.

They are both reckoned warm and diſcuſſive, and good againſt crudities of the ſtomach, aſthmas, and menſtrual obſtructions.

SAVOY, among gardeners, a well-known ſpecies of the braſſica, or cabbage. See the article CABBAGE.

SAURURUS, in botany, a genus of plants, whoſe flower is deſtitute of a corolla; the cups are diſpoſed in an oblong amentum, and are coloured and perſiſtent: the ſtamina are ſeven long hairy filaments, topped with oblong erect antheræ: the fruit is an ovate unilocular berry, containing an oval ſeed.

SAURURUS, is alſo a name uſed by Plumier for ſeveral ſpecies of piper. See the article PIPER.

SAUSAGE, or SAUCIDGE, a popular food, prepared of ſome crude meat, uſually either pork or beef, chopped ſmall, ſeaſoned, and put into a ſkin or gut, in the manner of a black-pudding.

SAUVAGESIA, in botany, a genus of plants, whoſe flower conſiſts of five obtuſe equal petals, with a nectarium cut into five parts: the fruit is an ovate acuminated capſule, having one cell, and opening at the top with five valves, containing a number of ſmall ſeeds, placed in a longitudinal ſeries.

SAW, an inſtrument which ſerves to cut into pieces ſeveral ſolid matters; as wood, ivory, ſtone, &c.

The beſt ſaws are of tempered ſteel ground bright and ſmooth; thoſe of iron are only hammer-hardened: hence, the firſt, beſides their being ſtiffer, are likewiſe found ſmoother than the laſt. They are known to be well hammered by the ſtiff bending of the blade; and to be well and evenly ground, by their bending equally in a bow.

The edge in which are the teeth is always thicker than the back, becauſe the back is to follow the edge. The teeth are cut and ſharpened by a triangular file, the blade of the ſaw being firſt fixed in a whetting-block. After they have been filed the teeth are ſet, that is, turned out of the right-line, that they may make the kerf or fiſſure the wider, that the back may follow the better.

The ſaws by which marble and other ſtones are cut have no teeth; theſe are generally very large, and are ſtretched out and held even by a frame.

SAW-WORT, *Serratula*, in botany. See SERRATULA.

SAWING, dividing timber, &c. by the application of a ſaw, either by the hand or mill.

SAXIFRAGE, *Saxifraga*, in botany, a genus of

of plants, with a roſaceous flower, conſiſting of five plane ovated petals: the fruit is an unilocular capſule, of an oval form, containing a great many ſeeds.

The tuberoſities at the root of the white-flowered ſaxifrage are kept in the ſhops, under the name of ſaxifrage ſeeds: they are diuretic and attenuant; and therefore good in nephritic caſes, and obſtructions of the viſcera and menſes; ſome alſo recommend them in the jaundice and dropſy.

SCABIOUS, *Scabioſa*, in botany, a genus of plants, whoſe flower is compoſed of ſeveral floſcules; the general carolla is equal, each proper one is monopetalous and tubular, ſlightly cut into four or five ſegments: there is no pericarpium: the ſeeds are ſingle, being crowned with their proper cups, and placed on a convex receptacle.

The Indian or muſk ſcabious is cultivated in gardens for ornament; it is propagated by ſowing its ſeeds in the ſummer, and the year following the flowers will come out, and continue in beauty a long time.

The common wild ſcabious, which grows naturally in fields in many parts of England, is ſometimes uſed in medicine; it ſtands recommended as aperient, ſudorific, and expectorant, and has a place among the alexipharmics.

SCAFFOLD, among builders, an aſſemblage of planks and boards, ſuſtained by treſſels and pieces of wood fixed in the wall; whereon maſons, bricklayers, &c. ſtand to work, in building high walls, &c. and plaſterers, in plaſtering ceilings, &c.

Scaffold alſo denotes a timber-work, raiſed in the manner of an amphitheatre, for the more commodious viewing any ſhew or ceremony: it is alſo uſed for a little ſtage, raiſed in ſome public place, whereon to behead criminals.

SCALA, in anatomy, a name given to two canals in the cochlea of the ear. See the article EAR.

SCALA, in architecture, the ſame with ſtair caſe. See the article STAIR.

SCALADO, or SCALADE, in the art of war, a furious aſſault made on the wall or rampart of a city, or other fortified place, by means of ladders, without carrying on works in form to ſecure the men.

SCALE, a mathematical inſtrument, conſiſting of ſeveral lines drawn on wood, braſs, ſilver, &c. and variouſly divided, according to the purpoſes it is intended to ſerve; whence it acquires various denominations, as the plain-ſcale, diagonal-ſcale, plotting-ſcale, Gunter's-ſcale, &c.

Conſtruction and Uſe of the Plain-SCALE.—The plain-ſcale is an inſtrument much uſed in navigation, &c. for ſolving the ſeveral caſes of ſailing.

Having deſcribed the circle D B C A (plate LXXVIII. *fig.* 6.) and divided it into four quadrants, by the diameters A B and C D croſſing each other at right-angles: 1. To project the line of tangents, from the end C of the diameter C D, erect the perpendicular C G; then dividing the arch C B into nine equal parts, from the center E, through the ſeveral diviſions of the quadrant C B, draw lines till they cut the perpendicular C G, which will thereby become a line of tangents.

2. For the ſemi-tangents, or half-tangents, let lines be drawn from the point D, through the ſame diviſions upon the arch C B; and they will divide the radius B E into a line of ſemi-tangents, as is evident from Euclid, lib. 3. prop. 20.

3. For the ſecants, transfer the lines drawn from the center, through the ſeveral diviſions of the quadrant C B, to form the line of tangents, to the line E B continued to F, and the line E F will be a line of ſecants.

4. For the ſines, from the ſeveral diviſions of the quadrant C B, let fall perpendiculars upon the radius C E, which will thereby be divided into a line of ſines, to be numbered from E to C for the right ſines, and from C to E for the verſed ſines; and theſe verſed ſines may be continued to 180°, if the ſame diviſions be transferred on the other ſide of the center E.

5. For the chords, the arch C B being divided into nine equal parts, in the points 10, 20, 30, &c. if lines be imagined to be drawn from C to theſe diviſions, they will be the chords of their reſpective arches: wherefore, ſetting one foot of your compaſſes in the point C, and transferring the ſeveral lengths, C 10, C 20, C 30, &c. to the line C B, it will thereby be divided into a line of chords. Theſe ſeveral lines, which in the figure are drawn but to every tenth degree, might in the very ſame manner be conſtructed to every degree, if the circle were made large enough to admit of ninety diſtinct diviſions in the arch of one of its quadrants.

6. A line of rhumbs is thus conſtructed: divide the arch D B into eight equal parts, in the points 1, 2, 3, 4, &c. then ſetting one foot of the compaſſes in D, transfer the ſeveral diſtances D 1, D 2, D 3, from the arch to the line D B; which by this means will be divided into a line of rhumbs, each of which will anſwer to an angle of 11° 15′.

7. To conſtruct a line of longitude, divide the radius E A into ſixty equal parts, marking every ten with their proper numbers; from theſe diviſions, let fall perpendiculars upon the arch A D, and having drawn the line A D, with one of the compaſſes in A, transfer the ſeveral diſtances, where the perpendiculars cut the arch to the line A D, which will thereby be divided into a line of longitude.

8. To project the line of latitude, the radius C E being already divided into a line of ſine, lay a ruler from the point B through each of the ſaid diviſions, and mark the points cut on the oppoſite arch A C with the numbers 10, 20, 30, &c. then having drawn the line A C, with one foot of your compaſſes in A, transfer the ſeveral interſections of the arch

arch to the ſaid line, which will thereby become a line of latitude.

9. To project the hour-line, draw the tangent IK equal and parallel to the diameter CD, and divide half the arch of each quadrant AC, and AD, from the point A, into three equal parts, which will be 15° each part, for the degrees of every hour from twelve to ſix; each of which parts are to be again ſubdivided into halves and quarters, &c. then drawing lines from the center E, through each of their diviſions and ſubdiviſions, till they cut the tangent IK, the ſaid tangent will thereby be divided into a line of hours.

10. To the above lines may be added a line of inclination of meridians, which is projected in the ſame manner as the hour-line; being only divided into degrees, inſtead of time, every fifteen degrees being equal to an hour.

Now, if theſe lines, with their reſpective diviſions, be transferred to a ſcale, and there alſo be added a line of equal parts, the inſtrument called the plain-ſcale, will be completed, as in *fig.* 7; and as to the uſes of theſe lines, thoſe of tangents, ſemi-tangents, and ſecants, ſerve to find the centers and poles of projected circles, in the ſtereographic projection of the ſphere, &c. the line of ſines ſerves for orthographic projection of the ſphere; the line of chords ſerves either to lay down any angle, or meaſure the quantity of one already laid down; the line of rhumbs ſerves with more readineſs than the line of chords, to lay down or meaſure the angle of a ſhip's courſe in navigation; the line of longitude being laid down on the ſcale, contiguous to a line of chords of the ſame radius, and numbered the contrary way, ſhews by inſpection, how many miles there are in a degree of longitude in each parallel of latitude, reckoning the latitude upon the line of chords, and the miles of longitude upon the line of longitude; the two lines of latitudes and hours, are uſed conjointly, and ſerve very readily to mark the hour-lines in the conſtruction of dials, on any kind of upright planes. See the articles NAVIGATION, TRIGONOMETRY, &c.

Diagonal-SCALE, is projected thus: firſt draw eleven parallel lines at equal diſtances (ſee plate LXXVIII. *fig.* 8.) the whole length of which being divided into a certain number of equal parts, according to the length of the ſcale, by perpendicular parallels, let the firſt diviſion be again ſubdivided into ten equal parts, both above and below; then drawing the oblique lines from the firſt perpendicular below to the firſt ſubdiviſion above, and from the firſt ſubdiviſion below to the ſecond ſubdiviſion above, &c. the firſt ſpace ſhall thereby be exactly divided into one hundred equal parts; for as each of theſe ſubdiviſions is one-tenth part of the whole firſt ſpace or diviſion, ſo each parallel above it is one-tenth of ſuch ſubdiviſion, and conſequently one-hundredth part of the whole firſt ſpace; and if there be ten of the larger diviſions, one-thouſandth part of the whole ſcale.

If, therefore, the larger diviſions be accounted units, the firſt ſubdiviſions will be tenth parts of an unit; and the ſecond ſubdiviſions, marked by the diagonals on the parallels, hundredth parts of an unit.

Again, if the larger diviſions be reckoned tens, the firſt ſubdiviſions will be units, and the ſecond ſubdiviſions tenth parts: and if the larger diviſions be accounted hundredths, the firſt ſubdiviſions will be tens, and the ſecond units; and ſo on. See the article PLOTTING.

Gunter's-SCALE, an inſtrument ſo called, from Mr. Gunter, its inventor, and is generally made of box.

There are two ſorts, the long-Gunter and the ſliding-Gunter, having both the ſame lines, but differently uſed; the former with the compaſſes, the latter by ſliding.

The lines now generally delineated on thoſe inſtruments are the following, viz. a line of numbers, of ſines, tangents, verſed ſines, ſine of the rhumb, tangent of the rhumb, meridional parts, and equal parts; which are conſtructed after the following manner:

The line of numbers is no other than the logarithmic ſcale of proportionals, wherein the diſtance between each diviſion is equal to the number of mean proportionals contained between the two terms, in ſuch parts as the diſtance between 1 and 10 is 1000, &c. = the logarithm of that number. Hence it follows, that, if the number of equal parts expreſſed by the logarithm of any number, be taken from the ſame ſcale of equal parts, and ſet off from 1 on the line of numbers, the diviſion will repreſent the number anſwering to that logarithm.

Thus, if you take .954, &c. (the logarithms of 9) of the ſame parts, and ſet it off from 1 towards 10, you will have the diviſion ſtanding againſt the number 9. In like manner, if you ſet off .903, &c. .845, &c. .778, &c. (the logarithms of 8, 7, 6,) of the ſame equal parts from 1 towards 10, you will have the diviſions anſwering to the numbers, 8, 7, 6. After the ſame manner may the whole line be conſtructed.

The line of numbers being thus conſtructed, if the numbers anſwering to the natural ſines and tangents of any arch, in ſuch parts as the radius is 10000, &c. be found upon the line of numbers, right againſt them will ſtand the reſpective diviſions anſwering to the reſpective arches; or, which is the ſame thing, if the diſtance between the center and that diviſion of the line of numbers, which expreſſes the number anſwering to the natural ſine or tangent of any arch, be ſet off on its reſpective line from its center towards the left hand, it will give the point anſwering to the ſine or tangent of that arch: thus the natural ſine of 30 degrees being 5000, &c. if

the distance between the center of the line of numbers (which in this case is = 10000, &c. = the radius) and the division, on the same line representing 5000, &c. be set off from the center, or 90 degrees, on the line of sines, towards the left hand, it will give the point answering to the sine of 30 degrees. And after the same manner may the whole line of sines, tangents, and versed sines, be divided. See the article GUNTER.

The line of sines, tangents, and versed sines, being thus constructed, the line sine of the rhumb, and tangent of the rhumb, are easily divided; for, if the degrees and minutes answering to the angle which every rhumb makes with the meridian, be transferred from its respective line to that which is to be divided, we shall have the several points required: thus if the distance between the radius or center, and sine of 45 degrees = the fourth rhumb, be set off upon the line sine of the rhumb, we shall have the point answering to the sine of the fourth rhumb; and after the same manner may both these lines be constructed.

The sine of meridional parts is constructed from the table of meridional parts, in the same manner as the line of numbers is from the logarithms.

The lines being thus constructed, all problems relating to arithmetic, trigonometry, and their depending sciences, may be solved by the extent of the compasses only; and, as all questions are reducible to proportions, the general rule is, to extend the compasses from the first term to the second, and the same extent of the compasses will reach from the third to the fourth; which fourth term must be so continued as to be the thing required, which a little practice will render easy.

SCALE, *Scala*, in music, is a denomination given to the arrangement of the six syllables invented by Guido Aretine, *ut*, *re*, *mi*, *fa*, *sol*, *la*, called also gamut. See the article GAMUT.

SCALE, in geography and architecture, a line divided into equal parts, placed at the bottom of a map, or plan, to serve as a common measure for all the parts of a building, or all the distances or places of a map.

SCALENE, or SCALENOUS TRIANGLE, *Scalenum*, in geometry, a triangle whose sides and angles are unequal. See the article TRIANGLE.

SCALENUS, in anatomy, a name given to one of the flexors of the neck.

This muscle has its origin from the first, second, and sometimes third rib; and is inserted into the apophyses of the vertebræ of the neck, and is by some justly referred to the number of the elevators of the thorax.

The scalenus is frequently divided into three parts, hence some anatomical writers have made three muscles of it, under the names of the first, second, and third scalenus.

SCALLOP, or IRISH-SCALLOP, in ichthyology, a name for the blue-ribbed red pecten, variegated with white; being about two inches long, and nearly as much in breadth, having on the surface about fifteen broad depressed ribs, placed at nearly equal distances from one another; the valves are very little elevated, and the ears are moderately large, and one a little bigger than the other. See the article PECTEN.

SCALPEL, in surgery, a kind of knife used in anatomical dissections and operations in surgery. See the article KNIFE.

SCALPER, or SCALPING-IRON, a surgeon's instrument used for scraping foul carious bones.

SCAMMONY, in the materia medica, is a concreted vegetable juice of a plant of the same name, partly of the resin and partly of the gum kind, of which there are two sorts, distinguished by the names of the places from whence they are brought.

The Aleppo scammony is of a spongy texture, light and friable: it is of a faint disagreeable smell, and its taste is bitterish, very nauseous, and acrimonious.

The Smyrna scammony is considerably hard and heavy, of a black colour, and of a much stronger smell and taste than the former, otherwise it much resembles it.

In general, scammony is to be chosen friable and easily powdered, glossy when fresh broken; such as grows white on being moistened with the spittle; free from dirt, sand, or other foulnesses, and not too violently acrimonious in its taste.

Scammony is in great esteem and frequent use, and would be more so, if it were more to be depended upon: but there is so much difference in the purgative virtue of some masses of it, and that of others, that it is seldom to be depended upon alone in extemporaneous practice. It is, however, an ingredient in many compositions of the shops; and these are prescribed with other cathartics, for purging off serous humours. It is, in general, however, a better purge for robust people, than for those of more delicate constitutions; though with the correctives with which it is joined, it is given with safety to children.

The chemical writers have given us many preparations of scammony, among which are a tincture and a resin; but the scammony in substance is preferable to either; for they both irritate more, and yet purge less; the resin itself given in an equal dose with the crude scammony, will give fewer stools, and those attended with worse gripings.

The ancients used scammony externally for cutaneous eruptions, and to soften hard tumours; but at present it is used only as a purge. For the preparation of scammony by baking it in a quince, see DIAGRYDIUM.

SCANDALUM MAGNATUM, in law, is a defamatory

ſamatory ſpeech or writing to the injury of a perſon of dignity: for which a writ that bears the ſame name is granted for the recovery of damages. By ſtatute, no perſon is either by writing or ſpeaking to publiſh any falſe or ſcandalous news of any lord, prelate, officer of the government, judge, &c. on pain of impriſonment, till he produce his author; and if the ſame be publiſhed in a libel, the publiſher is indictable, and may be fined and impriſoned.

SCANDIX, ſhepherd's needle, in botany, a genus of umbelliferous plants, the general corolla of which is difform and radiated, and the proper flower conſiſts of five heart-ſhaped petals; thoſe which form the diſc are abortive; there is no pericarpium, but the flowers are ſucceeded by two very long grains, not unlike needles, that are convex and furrowed on one ſide, and flat on the other. This genus includes the chervil which grows in gardens; it is diuretic, and recommended by ſome againſt the gravel.

SCANNING, *Scanſio*, in poetry, the meaſure of a verſe by feet, in order to ſee whether or no the quantities be duely obſerved.

The term is chiefly uſed in regard to the Greek and Latin verſes. Thus an hexameter verſe is ſcanned, by reſolving it into ſix feet; a pentameter, by reſolving it into five feet, &c.

SCAPE-GOAT, in Jewiſh antiquity, the goat which was ſet at liberty on the great day of expiation. See EXPIATION.

Spencer is of opinion, that the ſcape-goat was called azazel, becauſe it was ſent to azazel, i. e. the devil; the reaſons of which ceremony, he takes to be theſe: 1. That the goat, loaded with the ſins of the people, and ſent to azazel, might denote the miſerable condition of ſinners. 2. The goat was ſent thus loaded to the dæmons, to ſhew that they were impure, and to deter the people from worſhipping them. 3. That the goat ſent to azazel ſufficiently expiating the ſins of the Iſraelites, they might the more willingly abſtain from the expiatory ſacrifices of the heathens.

SCAPHISM, *σκαφισμος*, in Perſian antiquity, a kind of torture, or capital puniſhment; which conſiſted in locking the criminal in a ſort of box made of the trunk of a tree, with only five holes, for his head, arms, and legs to come through; then anointing the parts with honey and milk, in order to invite the flies, &c. he was expoſed to the ſun; and, in this unhappy ſituation he continued till death put an end to his miſery.

SCAPHOIDES, in anatomy, the ſame with naviculare os. See the article NAVICULARE OS.

SCAPULA, in anatomy, the ſhoulder-blade, a triangular bone, ſituated on the outſide of the ribs, and commonly extended from the ſecond to the ſeventh rib; its ſuperior poſterior angle, when it is in the leaſt ſtraining poſition, being about three inches from the ſpinal proceſſes of the vertebræ, while the long ſide between that angle and the inferior one is ſtretched obliquely forward as it deſcends, having nothing between it and the ribs, except the thin extremities of ſome muſcles; but as the ſcapula advances forwards to its articulation with the arm bone, its diſtance from the ribs increaſes.

SCAPULAR, *Scapulares*, in anatomy, a name given to two pair of arteries, and as many veins; the arteries are the external ſcapular artery, which is ſent from the ſubclavians to the external part of the ſcapula; and the internal ſcapular artery, which ariſes from the axillary arteries, and goes to the parts that lie under the ſcapula. The ſcapular veins, which are alſo external and internal, ariſe in like manner from the ſubclavians.

SCAPULAR, or SCAPULARY, a part of the habit of ſeveral religious orders in the church of Rome, worn over the gown, as a badge of peculiar veneration for the bleſſed Virgin. It conſiſts of two narrow breadths or ſlips of cloth, covering the back and the breaſt, and hanging down to the feet.

SCAPUS, in architecture, the ſuſt or ſhaft of a column.

In botany, the ſame word is uſed for the ſtrait ſtalk or ſtem of a plant, ſtanding upright like a pillar or column.

SCARABÆUS, the beetle, in zoology, a numerous genus of inſects, of the coleoptera-order: the antennæ of the beetles are of a clavated figure, and fiſſile longitudinally; and their eggs all hatch into hexapode worms, from which the young beetles are afterwards produced.

SCARIFICATION, in ſurgery, the operation of making ſeveral inciſions in the ſkin by means of lancets, or other inſtruments, particularly the cupping inſtrument.

SCARLET, a beautiful bright red.

In painting in water-colours, minium mixed with a little vermilion produces a good ſcarlet: but if a flower in a print is to be painted of a ſcarlet-colour, the lights as well as the ſhades ſhould be covered with minium, and the ſhaded parts finiſhed with carmine, which will produce an admirable ſcarlet.

SCARLET-FEVER, the ſame with miliary fever. See MILIARY-FEVER.

SCARP, in fortification, is the interior talus, or ſlope of the ditch next the place, at the foot of the rampart.

SCARP, in heraldry, the ſcarf which military commanders wear for ornament.

SCAVANT, a term purely French, ſignifying learned; it is little uſed in our language, except in the phraſe Journal des Sçavans, a journal of the works of the learned, publiſhed monthly at Paris.

SCAVENGERS, two officers annually choſen in every pariſh in London and its ſuburbs by the church-wardens, conſtables, and other inhabitants, to hire perſons called rakers, with carts, to clean the

the ſtreets, and carry away the dirt and filth, with the aſhes and duſt from every houſe. For which purpoſe a ſcavenger's tax may be made and levied on the inhabitants, being allowed by the juſtices of the peace; but it muſt not exceed 4 d. in the pound, of the rent paid for the houſes.

SCENE, *Scena*, in its primary ſenſe, denoted a theatre, or the place where dramatic pieces, and other public ſhews were exhibited: for it does not appear that the ancient poets were at all acquainted with the modern way of changing the ſcenes in the different parts of the play, in order to raiſe the idea of the perſons repreſented by the actors being in different places.

The original ſcene for acting of plays was as ſimple as the repreſentations themſelves; it conſiſted of only a plane plot of ground proper for the occaſion, which was in ſome degree ſhaded by the neighbouring trees, whoſe branches were made to meet together, and their vacancies ſupplied with boards, ſticks, and the like; and to complete the ſhelter, theſe were ſometimes covered with ſkins, and ſometimes with only the branches of other trees newly cut down, and full of leaves. Afterwards more artificial ſcenes or ſcenical repreſentations were introduced, and paintings uſed inſtead of the objects themſelves. Scenes were then of three ſorts, tragic, comic, and ſatyric. The tragic ſcene repreſented ſtately magnificent edifices, with decorations of pillars, ſtatues, and other things ſuitable to the palaces of kings: the comic exhibited private houſes with balconies and windows, in imitation of common buildings: and the ſatyric was the repreſentation of groves, mountains, dens, and other appearances; and theſe decorations either turned on pivots, or ſlid along grooves, as thoſe in our theatres.

To keep cloſe to nature and probability, the ſcene ſhould never be ſhifted from place to place in the courſe of the play: the ancients were pretty ſevere in this reſpect, particularly Terence, in ſome of whoſe plays the ſcene never ſhifted at all, but the whole is tranſacted at the door of ſome old man's houſe, whither, with inimitable art, he occaſionally brings the actors. The French are pretty ſtrict with reſpect to this rule; but the Engliſh pay very little regard to it.

Scene is alſo a part or diviſion of a dramatic poem. Thus plays are divided into acts, and acts are again ſubdivided into ſcenes; in which ſenſe the ſcene is properly the perſons preſent at, or concerned in the action on the ſtage at ſuch a time: whenever, therefore, a new actor appears, or an old one diſappears, the action is changed into other hands; and therefore a new ſcene then commences.

SCENIC GAMES, among the ancients, were entertainments exhibited on the ſcena or theatre, including plays, dancing, and other theatrical performances.

The Romans were four hundred years without any ſcenic games, and at their inſtitution, ſome actors were ſent for from Hitruria; who, without reciting any thing, danced to the ſound of inſtruments; at length they began to rehearſe verſe, from thence they proceeded to plays, and thus by degrees, growing more and more perfect, their ſcenical ſhews were at laſt repreſented, with a juſtneſs and magnificence beyond every thing the world had ever ſeen.

SCENOGRAPHY, in perſpective, the repreſentation of a body on a perſpective plane; or, a deſcription thereof in all its dimenſions, ſuch as it appears to the eye. See the article PERSPECTIVE.

The ichnography of a building, &c. repreſents its plan, or ground-work; the orthography, is a view of the front, or one of its ſides; and the ſcenography, is a view of the whole building, front, ſides, height, and all, raiſed on the geometrical plan.

SCENOPEGIA, in Jewiſh antiquity, the ſame with the feaſt of tabernacles. See the article TABERNACLE.

SCEPTER, a kind of royal ſtaff, or battoon, borne by kings, on ſolemn occaſions, as an enſign of command and authority.

SCEPTER, in aſtronomy, one of the ſix new conſtellations of the ſouthern hemiſphere, conſiſting of ſeventeen ſtars.

SCEPTICISM, the doctrines and opinions of the ſceptics, whoſe diſtinguiſhing tenet was, that all things are uncertain and incomprehenſible, and that the mind is never to aſſent to any thing, but to remain in perpetual doubt and ſuſpence.

SCHEAT, or ſeat, a fixed ſtar of the ſecond magnitude, in the junction of the leg with the left ſhoulder of Pegaſus. See the article PEGASUS.

SCHEUCZERIA, in botany, a genus of plants, whoſe flower is apetalous; the calyx is divided into ſix oblong acute ſegments, and contains ſix very ſhort capillary filaments, topped with erect obtuſe antheræ: the fruit conſiſts of three roundiſh compreſſed capſules, containing in each an oblong ſolitary ſeed.

SCHINUS, in botany, a genus of plants, whoſe flower conſiſts of five patent petals, and ten ſtamina; the fruit is a globoſe berry, containing a round ſeed.

SCHISM, a ſeparation, or breaking off from communion with any church; on account of ſome diſagreement in matters of faith or diſcipline.

SCHOENUS, in botany, a genus of plants, whoſe flower conſiſts of ſix lanceolated, acute, and connivent petals, unequal in ſize and ſituation, diſpoſed in a kind of imbricated manner, and the exterior ones ſhorter than the reſt: there is no pericarpium; the ſeed is ſingle, of an oval but ſomewhat

what triquetrous form, largeſt in the upper part, and contained till ripe in the corolla.

This genus comprehends the cyperella and melanoſchœnus of Micheli.

SCHOLASTIC, *σχολαστικος*, ſomething belonging to the ſchools. See the article SCHOOL.

Scholaſtic divinity, is that part or ſpecies of divinity which clears and diſcuſſes queſtions by reaſon and arguments; in which ſenſe it ſtands, in ſome meaſure, oppoſed to poſitive divinity, which is founded on the authority of fathers, councils, &c.

The ſchool-divinity is now fallen into the laſt contempt, and is ſcarce regarded any where, but in ſome univerſities, where they are ſtill by their charters obliged to teach it.

SCHOLIAST, or COMMENTATOR, a grammarian, who writes ſcholia, that is, notes, gloſſes, &c. upon ancient authors, who have written in the learned languages. See the next article.

SCHOLIUM, a note, annotation, or remark, occaſionally made on ſome paſſage, propoſition, or the like.

This term is much uſed in geometry, and other parts of mathematics, where after demonſtrating a propoſition, it is cuſtomary to point out how it might be done ſome other way, or to give ſome advice, or precaution, in order to prevent miſtakes, or add ſome particular uſe, or application thereof.

SCHOOL, *Schola*, a public place, wherein the languages, humanities, or other arts and ſciences are taught: thus we ſay, grammar-ſchool, writing-ſchool, &c. See the article SCHOLASTIC.

SCHREBERA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped, with the edge cut into five oblong obtuſe ſegments: the ſtamina are five ſlender filaments, topped with roundiſh antheræ, and inſerted in the chaps of the corolla: the fruit is a depreſſed bilocular drupe, containing two ſeeds.

SCHWALBEA, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is the length of the cup, with the limb erect; the ſuperior lip is upright, concave and intire, and the lower one is trifid and obtuſe; the fruit is a bilocular capſule, containing two ſmall roundiſh ſeeds.

SCIARRI, in natural hiſtory, the matter which runs down in burning torrents from the craters of volcanos, and which probably contains mineral and metalic particles, it being ponderous and hard.

It ſeems to be the reſult of many ſorts of minerals melted together.

SCIATICA, the hip-gout, a violent and obſtinate pain in the hip, chiefly in the joint, where the head of the thigh-bone is received into the acetabulum of the coxendix.

This pain will ſometimes extend itſelf to the lower part of the loins, to the thigh, leg, and even the extremity of the foot, yet outwardly there is no ſwelling, no inflammation, nor change of colour in the ſkin; ſometimes there is ſuch a ſpaſm of the muſcles on the ſide affected, that the patient cannot ſtand upright without the utmoſt pain.

This diſorder may ariſe from the ſame cauſe with that which produces the gout; but it is moſt generally the effect of catching cold, or being expoſed to the open air; it may alſo be occaſioned by contuſions and venereal diſorders. See the article GOUT, &c.

After a gentle cathartic, or clyſter, bleeding will be proper, eſpecially in the ancle; alſo leeches applied to the hæmorrhoidal veins, have been found beneficial; ſtrong purges are hurtful, but mercurius dulcis with ſcammony, or ſome other purgative, will be of ſervice; ſome give mercurial emetics, and afterwards mercurial purgatives, repeated twice a week, or as occaſion requires, for ſix times.

If the patient is old, lenient purgatives will be moſt proper, and on intermediate days a doſe of calomel, which is afterwards to be purged off, and ſo repeated alternately for ſome time.

Outwardly, the linamentum ſaponaceum is recommended by Reverius, Junker, and others; the part is to be anointed with it near the fire. Riverius ſays, he has known an obſtinate ſciatica cured in one day, by applying ſix cupping-glaſſes on and about the part affected, and then anointing it with oil of bricks hot, and afterwards covering it with a linen cloth, made very hot. Zacutus Luſitanus affirms, that the ſciatica has been cured in a few hours, by applying eight or ten leeches to the part affected. Baglivi obſerves, that if nothing elſe will do, recourſe muſt be had to cauſtics, particularly the leaves of ranunculus, or a mixture of quick-lime and ſoft ſoap.

SCIENCE, *Scientia*, in philoſophy, denotes any doctrine, deduced from ſelf-evident and certain principles, by a regular demonſtration.

SCILLA, the ſquill, in botany, a genus of plants, whoſe flower conſiſts of ſix ovate deciduous petals, which ſpread open, and contain ſix ſubulated filaments, terminated with oblong incumbent antheræ: the fruit is a ſmooth oval three-furrowed capſule, with three cells, which contain a number of roundiſh ſeeds.

This genus includes the ſtarry-hyacinth.

The roots of the common ſquill are brought from the Levant and Spain every year, and uſed in medicine: thoſe ſhould be choſen that are freſh, of a middle ſize, ſound, heavy, firm, and full of a clammy, bitter, acrid juice: they are excellent in diſorders of the lungs cauſed by a viſcous phlegm, and act with great efficacy in fits of the moiſt aſthma, and in a diſpoſition to the dropſy: the moſt uſual form in which it is preſcribed, is that of the oximel, made of a ſtrong infuſion of the root in vinegar, or made into a ſyrup of honey.

SCIOPTIC, a ſphere or globe of wood, with a circular hole, or perforation, wherein a lens is placed.

placed. It is ſo fitted that, like the eye of an animal, it may be turned round every way, to be uſed in making experiments of the darkened room. See CAMERA OBSCURO.

SCIRE-FACIAS, in law, a judicial writ moſt commonly iſſued to call a perſon to ſhew cauſe to the court whence it iſſues, why execution of a judgment paſſed ſhould not be made out; as where a plaintiff has recovered debt or damages in a court of record, and does not take out execution in a year and a day after judgment recovered: in that caſe, he ſhall have this writ to ſummon the defendant to ſhew cauſe why execution ſhould not be had againſt him upon the ſaid judgment; which, if the defendant does not, judgment is given and the plaintiff ſhall have execution.

SCIRPUS, in botany, a genus of plants, whoſe flower hath no corolla; the calyx is a ſpike, imbricated all round, and the ſcales are oval; there are three filaments, topped with oblong antheræ; the germen is ſmall, and there is no pericarpium: the ſeed is ſingle, three-cornered, and pointed, and the hairs are longer than the cup.

This genus comprehends the club-ruſh and bulruſh.

SCIRRHUS, σκιῤῥος, in ſurgery and medicine, a hard tumour of any part of the body, void of pain, ariſing from the inſpiſſation and induration of the fluids contained in a gland, though it may appear in any other part, eſpecially in the fat, being one of ways wherein an inflammation terminates.

SCISSARS, a well-known inſtrument for cutting any thing aſunder. See the article FORCEPS.

SCLAREA, clary, in botany, a genus of plants, according to Tournefort; but comprehended by Linnæus among the ſages. See the articles SALVIA and SAGE.

The common garden clary is a biennial plant, the lower leaves of which are large, rough, wrinkled, and of an oblong heart-ſhaped form, ending in blunt points, and ſawed on their edges: the ſtalks are large, four-cornered, and clammy, and riſe about two feet high; they are furniſhed with leaves of the ſame ſhape, but leſs: the flowers are diſpoſed in looſe ſpikes on the top of the ſtalks; they are of a pale blue colour, placed in whorles, and are of the lip kind, like thoſe of ſage; they come out in June or July, and the ſeeds ripen in Autumn.

The whole plant has a very ſtrong ſmell, and is ſaid to be good in female weakneſſes: the ſhops have a ſpirit under its name, which is drawn from an infuſion of the herb in ſpirit of wine, which is very pleaſant and a good cordial.

SCLERANTHUS, knawel, in botany, a genus of plants, whoſe flower hath no corolla, but conſiſts of a monophyllous tubulated cup, cut half way into five acute ſegments, and contains ten ſubulated filaments, topped with roundiſh antheræ: the fruit is a very narrow ovate capſule, incloſing two ſeeds, convex on one ſide and flat on the other.

The hoary perennial knawel is the plant, at the roots of which is found the coccus polonicus, a very valuable ſcarlet dye. See the article COCCUS.

SCLEROTICA, in anatomy, one of the tunics or coats of the eye: it is hard, opake, and extended from the cornea to the optic nerve; its fore part is tranſparent and called the cornea.

SCLEROTICS, medicines proper to harden and conſolidate the fleſh of the parts to which they are applied; as purſlain, houſe-leek, flea-wort, garden night-ſhade, &c.

SCOLOPAX, the wood-cock, in ornithology, a ſpecies of numenius, with a black line on each ſide the head; it is a very beautiful and delicate bird, ſomewhat ſmaller than the partridge. See the article NUMENIUS.

SCOLOPENDRA, in zoology, an inſect with a very ſlender and long body, and furniſhed with a vaſt number of legs.

According to Dale, it is ſometimes uſed as a depilatory, boiled in wine.

SCOLYMUS, the golden-thiſtle, in botany, a genus of plants, whoſe flower is compound, imbricated, and uniform, conſiſting of a number of ligulated linear corollulæ: there is no pericarpium, but the cup contains the ſeeds, which are ſolitary, oblong, triangular, and placed on a paleaceous receptacle.

SCONCE, in fortification, a ſmall field fort, built for the defence of ſome paſs, or other poſt. See the article FORT.

SCOPARIA, in botany, a genus of plants, whoſe flower is monopetalous, rotated, patent, and divided at the brim into four ſegments: the fruit is an oblong, conic, acuminated capſule, with one cell, opening with two valves, and contains a number of oblong ſeeds.

SCORBUTUS, the ſcurvy, in medicine. See the article SCURVY.

SCORDIUM, water-germander, in botany, a plant which hath a fibrous, creeping, perennial root, from which ariſe ſeveral branches, that are ſquare, hairy, hollow, branched, and creep on the ground; they are furniſhed with oblong, wrinkled, hairy leaves, dentated on their edges, having a ſtrong garlic odour with a bitter taſte: the flowers grow from the places where the leaves join the ſtalk; they are ſmall, and conſiſt of a ſmall labiated petal of a reddiſh colour, and appear in July; they are ſucceeded by four ſmall roundiſh ſeeds, placed in the bottom of the cup: this plant grows on moiſt marſhy places, on the ſide of ditches, &c.

It is looked upon as aperient, diaphoretic, and pectoral, and is juſtly eſteemed a good alexipharmic, and accordingly is preſcribed in malignant diſorders; it is a principal ingredient in the confectio Fracaſtorii,

torii, which takes its name of diaſcordium from it. See the article DIASCORDIUM.

This plant is comprehended by Linnæus among the teucriums. See TEUCRIUM.

SCORIA, droſs, among metallurgiſts, is the recrements of metals in fuſion; or, more determinately ſpeaking, is that maſs which is produced by melting metals and ores, and when cold is brittle, and not diſſoluble in water, being properly a kind of glaſs.

SCORIFICATION, in metallurgy, is the art of reducing a body, either entirely, or in part, into ſcoria. See the preceding article.

SCORPIO, the ſcorpion. See SCORPION.

SCORPIOIDES, in botany, the ſame with ſcorpiurus. See the article SCORPIURUS.

SCORPION, *Scorpio*, in zoology, a genus of wingleſs inſects, the body of which is of an oval figure; the tail is long and ſlender, and the whole body covered with a firm and ſomewhat hard ſkin; the eyes are eight in number, two of which are placed contiguous, and ſix ſide-ways; the legs are eight; and there is alſo a pair of claws at the head, and a pointed weapon at the extremity of the tail.

The great yelloviſh Barbary ſcorpion, with eight denticulations, when full grown, meaſures ſix or ſeven inches in length: there are ſeveral other ſpecies.

SCORPION, *Scorpio*, in aſtronomy, the eighth ſign of the zodiac, denoted by this character, ♏. See the articles SIGN and ZODIAC.

The ſtars in Scorpio, in Ptolemy's catalogue, are twenty; in that of Tycho, ten; but in that of Mr. Flamſtead, forty-nine: the longitudes, latitudes, magnitudes, &c. are as follow:

Names and Situations of the Stars.	Signs.	Longitude.	Latitude.		Magn.
		° ′ ″	° ′ ′		
In the firſt ſouth. foot	♏	27.48.50	5.26.33	A	6
Subſeq. in the firſt foot		28.18. 8	4.54.13	A	5
Contig. to this		28.30.49	4.46.19	A	7
That preced. ſouth of forehead		28.55.46	5.43.48	A	6
In third ſouth foot		29.48.52	8.33.25	A	4 3
5.					
South of 3 in the forehead		29.37.25	5.25.46	A	3
Middle of the forehead		29.15.50	1.56.31	A	3 2
North of the forehead		29.52.56	1. 3. 9	B	2
Contig. ones under north. ſtar of forehead { north		21.45	16. 5	B	5
Contig. ones under north. ſtar of forehead { ſouth		32. 9	5.56	B	5
10.					
		29. 1.13	8. 4.40	B	6
Preced. in the laſt ſouth foot	♐	3. 35	7. 7. 3	A	6
Contig. thereto northward		2.55.59	6.38.22	A	6 5
Moſt north and following forehead		1.20.11	1.40.50	B	4
	♏	29.19.54	12.29.24	B	6
15.					
	♐	23.11	9.15.16	B	6
		9.23	12.46.32	B	6
Subſeq. in laſt ſouth foot		4.22.10	7. 2.25	A	6 5
That over the other preced. heart		4. 7.17	2.37.10	A	6
That preced. heart northward		4.29.24	3.59. 4	A	4
20.					
In preced. heel of Ophiuchus		4.14.42	1.36. 3	B	5
Under the ſole of Ophiuchus's foot		5. 7.17	1.42.45	A	6
In Ophiuchus's leg.		4.40.27	3.16.29	B	5
Scorpion's heart		6.26. 4	4.31.26	A	1
That over the heart		6.25.12	3.11.30	A	5
25.					
In the calf of Ophiuchus's fore leg		5.21.27	3. 5.10	A	6
In the fore ankle of Ophiuchus		6.19.53	11.39.47	A	3
That following the heart to ſouth.		8. 7.56	10.29.56	A	6
Fore knee of Ophiuchus		5.54.28	7.14.12	B	3
Inform. between Ophiuchus's legs		7.59.26	3.56.17	A	6
30.					

Names and Situations of the Stars.	Signs.	Longitude ° ′ ″	Latitude ° ′ ″		Mag.
		10.12.54	3. 5.10	A	6
In the firſt ring of the tail		12. 3.32	11.39.47	A	3
More north. and poſterior to this		13.22. 1	10.29.56	A	6
Poſterior knee of Ophiuchus		14.39.28	7.14.12	B	3
		16.28.32	3.56.17	A	6
35.					
In toe of Ophiuchus's hind foot		16.43 28	3.24.16	A	5
		16.55.15	3.20. 8	A	6
		17.12.46	3.29.39	A	6 7
In back of Ophiuchus's ſecond foot		17. 6.17	1. 8.53	A	6
In tibia of Ophiuchus's hind leg.		17.34 52	2. 4.47	B	4
40.					
		18. 23	1.42.28	A	6 7
Bright ſtar of Ophiuchus's foot		18. 5. 2	1.43.38	A	3
		18.34.53	4 54.52	A	6
		18.43.57	59.54	A	7
Preced. in Ophiuchus's heel		19. 1.32	53.48	A	5
45.					
Preced. of 2 in the ring		20.41.16	13.57.14	A	3 4
Subſequent		21.15.12	13.44.16	A	2 3
Subſeq. in Ophiuchus's heel		20. 9.46	38.18	A	5
That following Ophiuchus's foot	♐	21.46.23	1.28.55	B	6

SCORPION, in the ancient art of war, an engine chiefly uſed in the defence of the walls of fortified places, by throwing arrows, fire-balls, or great ſtones.

SCORPION, *Sena*, in botany. See the article CORONILLA.

SCORPIURUS, rough caterpillars, in botany, a genus of plants, producing papilionaceous flowers; the vexillum is roundiſh, emarginated, reflexed and patent; the alæ are almoſt oval, looſe, with obtuſe appendices; the carina is half-moon ſhaped, the belly gibbous, pointed, erect, and divided into two parts: the fruit is an oblong, taper, coriaceous, rough-channelled pod, much reſembling a caterpillar, containing ſeveral cells, each incloſing a roundiſh ſeed.

The plants of this genus are annual, and propagated by ſowing their ſeeds in the ſpring where they are intended to perfect themſelves; in June the flowers will appear, which are ſucceeded by pods, ſo much like caterpillars, that a perſon at a ſmall diſtance would imagine they were real caterpillars feeding on the plants.

This genus comprehends the ſcorpoides and campoides of authors.

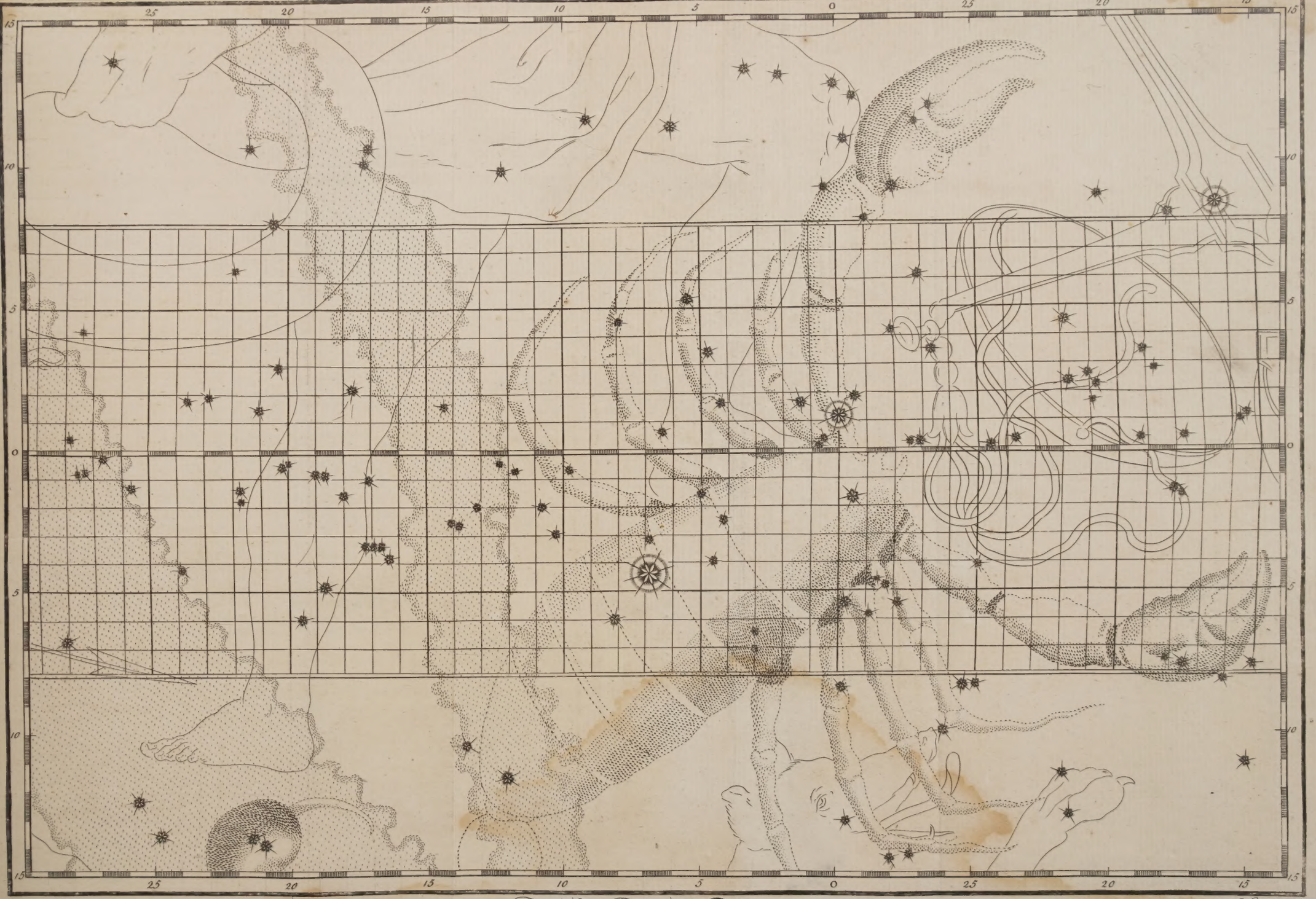
SCORZONERA, Viper's-graſs, in botany, a genus of plants, whoſe flower is compound, imbricated and uniform, conſiſting of a number of monopetalous, ligulated, linear, hermaphrodite corollulæ, which are indented at their extremity in five parts, and contain five ſhort capillary filaments, which are terminated with cylindraceous tubuloſe antheræ; there is no pericarpium, but the ſeeds, which are ſolitary, oblong, ſtriated, and crowned with a plumoſe down, are contained in the imbricated cup, on a naked recepticle. The broad-leaved ſcorzonera is cultivated in gardens for culinary and medicinal purpoſes, and is propagated by ſowing the ſeeds in the ſpring on light earth, and afterwards thinning the plants out to about ſix or eight inches aſunder. The root of this plant abounds with a milky juice of a bitteriſh ſubacrid taſte, and is ſaid to ſtrengthen the ſtomach, and promote urine and ſweat, and boiled is reckoned a very good food.

SCREW, or SCRUE, *Cochlea*, one of the five mechanical powers. A ſcrew is a cylinder cut into ſeveral concave ſurfaces, or rather a channel or groove made in a cylinder, by carrying on two ſpiral planes the whole length of the ſcrew, in ſuch a manner, that they may be always equally inclined to the axis of the cylinder in their whole progreſs, and alſo always inclined to the baſe of it in the ſame angle.

The ſcrew may alſo be conſidered as a wedge carried round a cylinder, which in that caſe is called the arbor of the ſcrew; the wedge, ſo carried on, making what is called the thread of the ſkrew; as may be ſeen in plate LXXX. *fig.* 1, 2, 3, 4, 5. The arbor of the ſcrew being A B in *fig.* 1, and *a c b d* in *fig.* 2, as if the cylinder A C B D was inſcribed within the ſcrew. Here, we may ſee the manner how a ſcrew is made; for if it be cut out of the cylinder P H I Q, then H K L M N O P is a ſpiral line going about the cylinder, making the prominent part to be left of the ſaid cylinder; and *h k l m n o*, the line marking the depth to which the ſcrew is to be cut, ſuppoſing the ſame line to go round the inner cylinder or arbor A B C D, though not

PLATE LXXX

Facing Scorpio.



SCORPIO

J. Lodge sculp.

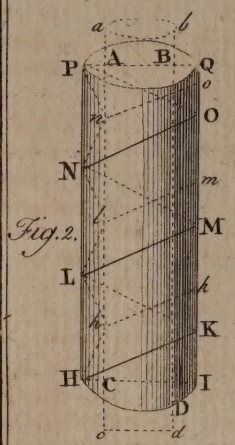


Fig. 2.

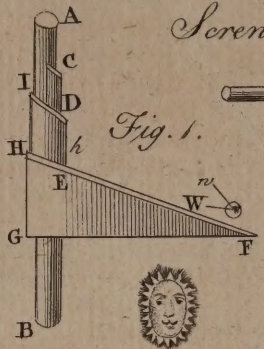


Fig. 1.

Screws.

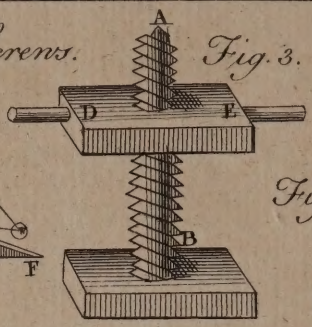


Fig. 3.

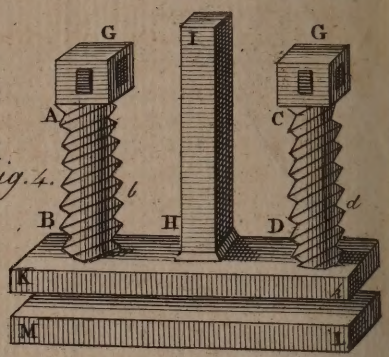


Fig. 4.

Shadows.

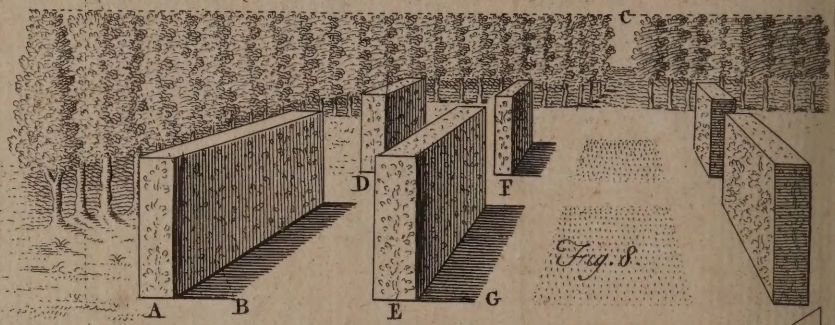


Fig. 8.

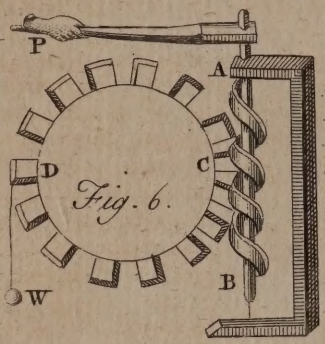


Fig. 6.

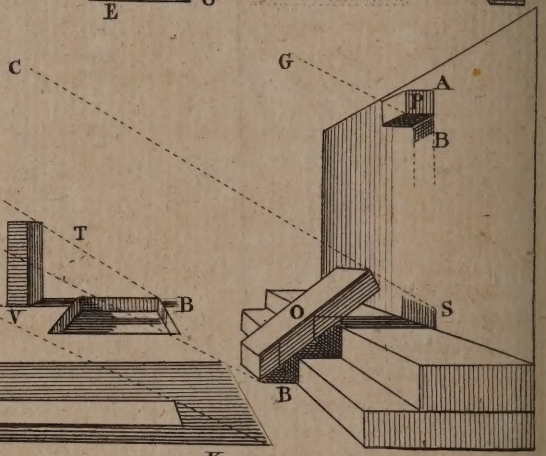


Fig. 9.

Archimedes's Screw.

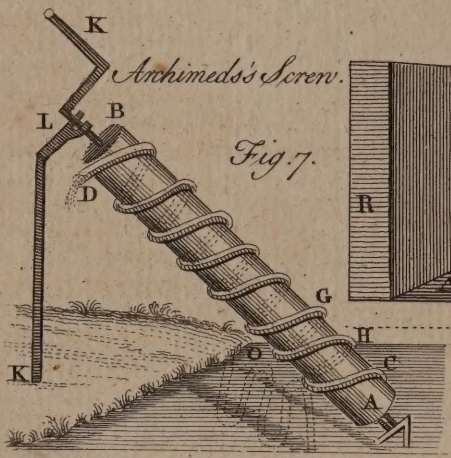
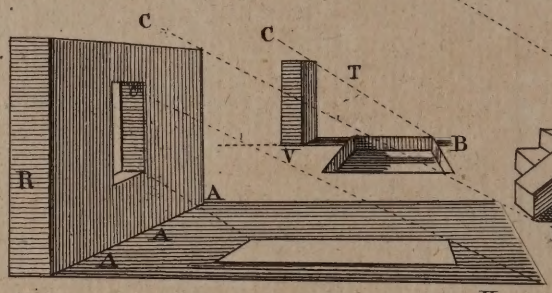


Fig. 7.



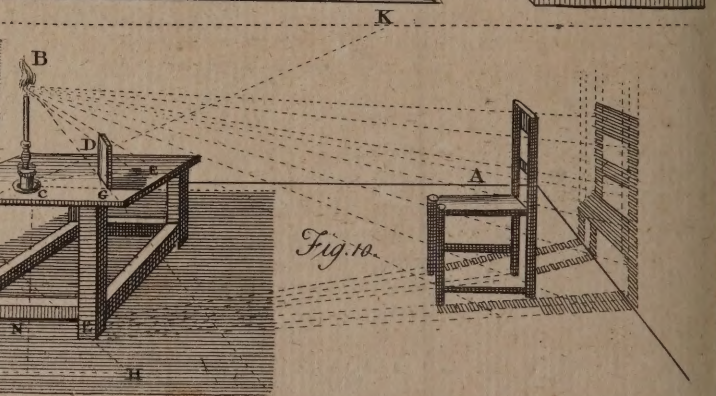


Fig. 10.

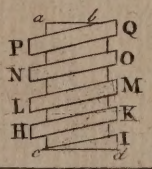


Fig. 5.

T. Lodge Sculp.

not expreſſed here, to avoid confuſion; and then *h L l N n*, &c. will repreſent the prominent part or thread of the ſcrew. Now, if inſtead of cutting the hollows, H *h* L, L *l* N, N *n* P, into the cylinder P H I Q, a continued wedge be fixed to a ſmaller cylinder, as A C B D, or rather *a c b d*, the ſame kind of ſcrew will be made, and *a b c d* will be the arbor of that ſcrew. Sometimes the moſt prominent part of the thread, as L N, &c. is not ſharp but flat, and then the thread is called a ſquare thread, as in *fig.* 5. which repreſents the ſection of ſuch a ſcrew. This ſort of thread is not uſed in wood, but in iron, and in other metals; it is of good ſervice, being commonly more durable, and raiſing the weight with more eaſe than the ſharp thread.

Force of the SCREW. To make an eſtimate of the force of the ſcrew, which may be compared either to an inclined plane, or to a wedge, according as its arbor does or does not advance in a progreſſive motion whilſt it turns round its axis to raiſe or ſtop a weight, or to preſs bodies together, which are the ſeveral uſes of a ſcrew, let us take a flexible wedge, as, for example, one of paper, and coil it round a cylinder, *fig.* 1. as is repreſented in the figure, where A B is the arbor, C I D one thread or helix, D H E another, and E T G part of the wedge left to ſhew the proportion between the power that turns the ſcrew and the weight W.

If the weight is puſhed up the wedge, (or, which is the ſame thing, raiſed perpendicularly by the wedge ſlipping under it) from F to H in the direction W *w*, then will H G be the velocity of the weight, and G T the velocity of the power, which is the caſe of the inclined plane becoming a wedge; and this will be the analogy for the ſcrew thus acting.

As a circle whoſe diameter is H *h*: to H I the diſtance of two threads:: (or as the baſe F G: to the perpendicular H G::) ſo is the weight: to the power applied to the arbor at A, to raiſe a weight up the thread H D I C.

N. B. We ſuppoſe the diameter of the arbor at A and of the ſcrew at H nearly equal.

This is the caſe of *fig.* 4, where the moveable plank D K is carried down, by turning round the heads G G of the ſcrews A B and C D, in order to preſs ſtrongly the bodies placed between the planks D K and M L, whilſt the piece H I, fixed on the upper plank, is either guided through a hole, or, being only looked at, ſerves to ſhew whether the plank K D be brought down horizontally, as the ſcrews are turned. When long levers are thruſt into the ſquare holes at the heads of the ſcrews, the force of the ſcrew is much increaſed, and then the weight will be to the power:: as the circumference of the circle deſcribed by that part of the lever to which the hand is applied: to the diſtance between two threads. Wherefore, as the circumference of the circle is to the diſtance of two thirds of an endleſs ſcrew:: ſo is the reſiſtance of the teeth of the wheel: to the power applied to the handle.

Archimedes's SCREW, in hydraulics, a kind of ſpiral pump, for raiſing water, ſo called from its inventor Archimedes.

It conſiſts of a long cylinder, with a hollow pipe, tube, or groove coiled round it, as repreſented in *fig.* 6, where A B repreſents the cylinder, and C D the tube open at each end. It is placed in an oblique poſition to the horizon, with the lower end in the water to be pumped away, the other end being ſupported on the lower part of the winch I K, by which the ſcrew and cylinder are turned round.

As ſoon as the ſcrew is immerſed in the water, it immediately riſes therein by the orifice C to the level of the ſurface of the water E F; and if the point of the helix or ſpiral, which in the beginning of the motion is coincident with the ſurface of the water, happens not to be on the lower ſide of the cylinder, the water will upon the motion of the ſcrew, move on in the ſpiral, till it comes to the point which is on the other ſide, and coincident with the ſurface of the water; when it is arrived at that point, which ſuppoſe at O, it cannot afterwards poſſeſs any other part of the ſpiral than that which is upon the loweſt part of the cylinder; for it cannot move from O towards H or G, becauſe they are ſituated higher above the horizon; and ſince this will conſtantly be the caſe, after the water in the ſpiral has obtained the point O, it is plain that it muſt always be on the under ſide of the cylinder.

But becauſe the cylinder is in motion, every part of the ſpiral ſcrew, from O to D, will, by degrees, ſucceed to the ſaid under part of the cylinder; the water, therefore, in the ſpiral, muſt ſucceed to every part thereof, from O to D, as it comes on the lower ſide; that is, it muſt aſcend on the lower part of the cylinder through all the length of the pipe, till it comes to the orifice D, where it will run out, as having nothing farther to ſupport it. Hence it appears how much thoſe gentlemen are miſtaken who, affecting the wonderful, ſay, 'That the water aſcends by deſcending;' whereas, if they would have made the moſt of the wonder, they might have truly ſaid, 'That the water aſcends becauſe it cannot aſcend,' i. e. that it aſcends one way becauſe it cannot aſcend another; but then the wonder is loſt.

Endleſs or Perpetual SCREW, one ſo fitted in a compound machine, as to turn a dented wheel; ſo called, becauſe it may be turned for ever without coming to an end: *fig.* 7.

If in the endleſs, or perpetual ſcrew, A B, whoſe threads take the teeth of the wheel C D, you take the diſtance of two threads, according to the length

of the axis A B; or the diſtance of two teeth in the wheel C D, in the direction of the circumference; and if a weight, W, act at the circumference of the wheel: then, if the power D be to the weight W, as that diſtance of the teeth or threads, to the length deſcribed by the power P in one revolution, the power and weight will be in æquilibrio; becauſe in one revolution of P, the wheel D C, with the weight W, has moved only the diſtance of one tooth.

SCREW-TREE, *Helicteres*, in botany. See the article HELICTERES.

SCRIBE, an officer among the Jews whoſe buſineſs was to write; of which there were three kinds: the firſt and principal of which were the ſcribes of the law, whoſe office was to write and interpret ſcripture; theſe were in great credit and eſteem among the Jews, and had even the precedency of the prieſts and ſacrificers, and their deciſions were received with almoſt the ſame reſpect as the law of God itſelf: the ſecond kind, properly called the ſcribes of the people, were a ſort of magiſtates: and the third were public notaries, or ſecretaries of the council; which were the leaſt conſiderable.

SCRIBING, in joinery, &c. is a term uſed when one ſide of a piece of ſtuff is to be fitted to another that is irregular. In order to make theſe join cloſe all the way, they ſcribe it; that is, they lay the piece to be ſcribed cloſe to the other they intend to ſcribe it to, and opening their compaſſes to the wideſt diſtance theſe two pieces ſtand from each other, they bear the point of one of the legs againſt the ſide they intend to ſcribe to, and with the other point draw a line on the ſtuff to be ſcribed. Thus they form a line on the irregular piece parallel to the edge of the regular one; and if the ſtuff be cut exactly to the line, when theſe pieces are put together they will ſeem a joint.

SCRIPTURE, an appellation given, by way of eminence, to the ſacred and inſpired writings of the Bible. See BIBLE, CANONICAL, &c.

SCROPHULA, the king's evil, in medicine, a hard glandulous tumour, uſually of the ſame colour with the ſkin, ſeated principally in the ſides of the neck, behind the ears, and under the chin: but though the principal ſeat of this diſeaſe is in the ſides of the neck, ſcarcely any part of the body is exempted from it. The humour ſometimes falls on the lungs, and brings on a pulmonary conſumption; and it is a dreadful circumſtance, that this diſorder is tranſmitted from parents to their children, by way of inheritance. As to the cure of this ſtubborn diſeaſe, ſays Dr. Mead, it is to be attempted by bleeding, purging, and ſuch medicines as are moſt proper for correcting the viſcidity, ſaltneſs, and acrimony of the humours. Of cathartics, the beſt is dulcified mercury ſix times ſublimed, which ſhould be joined with rhubarb for children; but to adults it may be given alone, with a gentle purging draught ſome hours after it. The next to this in virtue is jalap: and our purging waters are alſo uſeful, as they ſcour the glands and open the body at the ſame time. In fine, a pill compoſed of mercury ſix times ſublimed, and precipitated ſulphur of antimony, each one grain; of aloes three or four grains; made up with the ſyrup of balſam, and taken every night, will be found ſerviceable, not only in this diſeaſe, but in others ariſing from viſcid humours.

For correcting this pravity of blood and humours, the following powder may be taken twice a day, with three or four glaſſes of the leſs compound lime-water; take of burnt ſponge, one ſcruple; of purified nitre, coralline, and white ſugar, each ten grains; mix them together: and if the patient happen to be emaciated, equal quantities of milk may be mixed with the water. The expreſſed juice of millepedes will alſo be of ſome ſervice, on account of their diuretic quality. Iſſues likewiſe will be beneficial, to drain off the viſcous humour; and a change of aliment is often attended with good effects.

As to the patient's diet, which ought not to be neglected, let him feed on fleſh of eaſy digeſtion, and abſtain from all ſalt and ſmoke-dried meat and high-ſeaſoned things; and particularly from pork, hare, cheeſe, and in general from all things that are of hard digeſtion. Let him drink river-water, and that boiled; but ſtagnating or ſnow-water never.

SCROPHULARIA, figwort, in botany, a genus of plants, whoſe flower is monopetalous and unequal; the tube is large, globoſe, and inflated; the limb is divided into five ſmall parts, the two upper ones are large and erect, the ſide ones ſpread open, and the lower one is reflexed: the fruit is a roundiſh, acuminated, bilocular capſule, opening at the top, and containing many ſmall ſeeds.

A ſpecies of this genus, which grows wild in divers parts of England, is ſaid to be excellent in ſcrophulous diſorders; and is eſteemed externally as a remedy for the piles; it is generally made into an ointment for theſe purpoſes, and is alſo given internally in diet drinks.

SCROTUM, in anatomy, the capſula or bag in which the teſticles are contained, and which hangs down below the penis. See the article TESTICLE.

SCROTUM CORDIS, the ſame with pericardium. See PERICARDIUM.

SCROWLS, or SCROLLS, in architecture, the ſame with volutes. See VOLUTE.

SCRUPLE, a weight equal to the third part of a dram, or to twenty grains. See the article WEIGHTS.

Among goldſmiths it is equal to twenty-four grains.

The ſcruples of the moon, &c. eclipſed, are the parts

parts of the moon's diameter immerſed in the ſhadow, expreſſed in the ſame meaſure wherein the apparent diameter of the moon is expreſſed.

The ſcruples of half duration are an arch of the moon's orbit, which the center of the moon deſcribes, from the beginning of an eclipſe to its middle. Scruples of immerſion, are an arch which the moon's center deſcribes, from the beginning of the eclipſe to its middle. And ſcruples of emerſion, are an arch of the moon's orbit, deſcribed by her center from the time of the emerſion of her limb to the end of the eclipſe. See the article ECLIPSE.

SCRUTINY, a ſtrict examination of the ſeveral votes taken at an election, in order to diſcover unqualified voters.

SCULPTURE, an art by which, in taking away, or adding to matter, all ſorts of figures are formed by the hand, either in ſtone, wood, wax, or metal. In its full latitude it ſignifies both the art of working in creux, properly called engraving, and of working in relievo, which is more ſtrictly called ſculpture. See the articles ENGRAVING and RELIEVO.

The firſt works in ſculpture were with clay, not only in making ſtatues, but in forming models; and to this day, a ſculptor never undertakes any thing conſiderable, without forming a model either in clay or wax. In making figures of theſe materials, they begin and finiſh their work with their hands, uſing only three or four pieces of wood, which are roundiſh at one end, and at the other flat, with a ſort of claws and teeth, which are to ſmooth and ſcratch the work. For waxen models, to every pound of wax add half a pound of colophony; ſome add turpentine, and melt it together with oil of olives; more or leſs of the latter being uſed as they would have the matter harder or ſofter: ſome alſo add a little vermillion, to give it a colour: this is wrought and moulded with the fingers like clay. See the article MOULDING.

For ſculpture in wood, which we properly call carving, the firſt thing required is to chuſe wood proper for the work the ſculptor is to perform. If it be any thing large, and requires a great deal of ſtrength and ſolidity, the hardeſt and moſt durable wood is to be choſen; and for ſmaller works and ornaments, the ſofter wood is uſed; but it muſt be ſuch, however, as is firm and cloſe: for a large work, though it be only a ſingle figure, it is better to make uſe of ſeveral pieces of wood, or bits of board, glued together, than of one whole piece, which is more liable to crack; for a thick piece of wood may not be dried to the heart, however it may appear on the outſide.

Carving is performed with a great variety of chiſſels and other tools, for paring, ſcooping, rounding, &c. the ſeveral parts of the work.

In ſculpture in marble and other ſtone, the firſt thing to be done is to ſaw out a block of marble, of the bigneſs of the work to be performed; and this being done, the ſuperfluities are to be taken off by a ſtubbed point and a heavy mallet; thus, bringing near the meaſures required, the ſculptor reduces it ſtill nearer with a finer tool, called a dog's tooth, it having two points, but one not ſo ſharp as the other. After this he makes uſe of his gradine, which is a flat cutting tool, with three teeth; he then takes off with a ſmooth chiſſel, the ſcratches the gradine left on the marble, and uſes it with dexterity and delicacy, to give ſoftneſs and tenderneſs to his figure; till at length, taking raſps of different degrees of fineneſs, the work is gradually rendered fit for poliſhing.

To poliſh the work, the ſculptor uſes pumice-ſtone and ſmalt, then he goes over it with tripoli; and when he would give it more luſtre, rubs it with leather and ſtraw-aſhes. There are ſeveral other tools uſed by ſculptors, adapted to the different parts of the work, and the nature of the ſtone they make uſe of.

As the models of clay ſhrink when they grow dry, whenever ſculptors undertake a conſiderable piece of work, they only uſe the model for making a mould of plaſter or ſtucco, in which is formed a figure of the ſame matter, which thenceforth ſerves them for a model, and by which they adjuſt all their meaſures and proportions.

To proceed the more regularly, on the head of the model they place an immoveable circle, divided into degrees, with a moveable rule or index, fixed in the center of the circle, and divided alſo into equal parts: from the end of the rule hangs a line with a plummet, which ſerves to take all the points, to be transferred thence to the block of marble, from whoſe top hangs another plummet, like that of the model.

But there are ſome excellent ſculptors, who diſapprove of this method; urging, that the ſmalleſt motion of the model changes their meaſures, for which reaſon, they chooſe to take all their meaſures with the compaſſes.

SCUM, properly denotes the impurities which a liquor, by boiling, caſts up to the ſurface. See the article CLARIFICATION.

The term ſcum is alſo uſed for what is more properly called the ſcoria of metals. See the article SCORIA.

In this laſt ſenſe, the ſcum of lead is a ſort of ſmalt, of various colours; and the ſcum of ſilver is what we commonly call litharge. See the article LITHARGE.

SCURVY, *Scorbutus*, in medicine, Dr. Mead obſerves, is the name given by medical writers, to a diſeaſe ſo various and different in appearance, that it does not ſeem to be one and the ſame diſtemper.

Boerhaave obſerves, that the ſcurvy chiefly affects the inhabitants of cold northern countries, eſpecially

thoſe who live in marſhy, low, fat, and moiſt ſoils, near ſtagnating waters, whether freſh or ſalt.

Thoſe who live idle ſedentary lives are moſt ſubject, chiefly in the winter time, to the attacks of this diſtemper; as alſo thoſe feeding upon ſalted and ſmoke-dried fleſh, or fiſh, ſea-biſcuit, ſtinking water, unfermented farinaceous vegetables, peas, beans, ſharp, ſalt, old cheeſe; likewiſe thoſe who are ſubject to melancholic, maniacal, hyſteric, or hypochondriacal diſorders; or thoſe who have taken large quantities of the Peruvian bark without proper evacuations.

Dr. Pringle conſiders the ſcurvy as ariſing from a putrid cauſe only; and thinks that the ſpecies of that malady, ſaid to be owing to an acid, is ſo far from being ſo, that it were to be wiſhed this ſuppoſed ſpecies of ſcurvy had not been denominated of this diſtemper, and the more ſo, as he apprehends that in the countries moſt liable to the true ſcurvy, an acid is rarely to be blamed. He thinks, that if the acrimony of the fluids is great and ſudden, a fever or flux will enſue; but if the accumulation is ſo ſlow, that the body grows habituated to the putrefaction, a ſcurvy prevails; this is the caſe in long voyages, occaſioned by corrupted air and proviſions, on board unventilated ſhips, in marſhy countries from ſimilar cauſes, and in a leſſer degree in all northerly climates in moſt ſituations, from a want of due perſpiration of what is putrid, and eſpecially with the uſe of ſalted meats.

The ſcurvy, according to Sydenham, is known by a ſpontaneous wearineſs, a heavineſs of the body, difficulty of breathing, eſpecially after motion, rottenneſs of the gums, a ſtinking breath, frequent bleeding of the noſe, difficulty of walking, ſometimes a ſwelling and ſometimes a falling away of the legs, in which there are always livid, plumbeous, yellow, or violet-coloured ſpots, and the colour of the face is generally of a pale tawney.

Boerhaave obſerves, that the firſt ſtate of this diſeaſe begins with unuſual lazineſs, ſponaneous wearineſs; the patient loves to be in a ſitting or lying poſture; there is a pain in all the muſcles, as if he was over tired, eſpecially in the legs and loins; when he awakes in the morning, all his joints and muſcles ſeem to be tired and bruiſed. In the ſecond ſtate, the gums ſwell, grow painful, hot, and itching, and bleed upon the leaſt preſſure: the roots of the teeth grow bare and looſe; he feels pain in all the external and internal parts of the body, imitating diſtempers proper to the various parts.

In the third ſtate, the gums at length grow putrid, with a cadaverous ſmell; when they are inflamed, blood diſtils from them, and a gangrene enſues; the looſe teeth by degrees grow yellow, black, and rotten; the ſublinguor veins become varicoſe, and like rings; there are often fatal hæmorrhages, which break out from the external ſkin, without any appearance of a wound, from the lips, mouth, gums, noſe, lungs, ſtomach, liver, ſpleen, pancreas, inteſtines, womb, kidneys, &c. Obſtinate ulcers ariſe, which no application will cure, and are apt to turn to a gangrene; they break out in all parts of the body, but eſpecially the legs, and are attended with a ſtench; there is a kind of itch and dry ſcabs, with a dry and mild leproſy; the blood drawn from a vein is black and grumous, thick, and yet wants its due conſiſtence in the fibrous part; the ſerum is ſalt, ſharp, and abounding with a yellowiſh-green mucus on the ſurface: there are gnawing rending pains, quickly ſhifting from place to place, which grow more violent in the night, affecting all the joints, bones, and viſcera. In the fourth ſtate, there are fevers of various kinds which bring on an atrophy; ſometimes diarrhœas, dyſenteries, or violent ſtranguries; as alſo faintings and mortal anxieties, a dropſy, conſumption, convulſions, tremblings, a palſy, contractions, black ſpots, voiding of blood upwards and downwards, a putrefaction and conſumption of the liver, ſpleen, pancreas, meſentery: and now the contagion ſpreads very quick.

From this account of the diſeaſe, it appears, continues the laſt-mentioned author, that one part of the blood is faulty in being too thick, and the other in being too thin, with a ſalt, alkaline, or acid acrimony; wherefore, to diſcover which of the three predominates, requires the utmoſt attention, and the moſt accurate enquiry: for, in the cure of this diſeaſe, that which is thick is to be attenuated; that which is ſtagnant, rendered moveable; and that which is coagulated is to be made fluid.

It ought to be laid down, ſays Hoffman, as a general rule, that the ſcurvy, the moſt virulent of all chronical diſtempers, is not to be treated with draſtic but with the moſt mild and ſimple medicines: likewiſe the patient ſhould change the air in which the diſeaſe was formed, and remove from unhealthy places, where the air is impure, vapid, and deprived of its due elaſticity, cloudy, or impregnated with noxious exhalations, to places more ſalutary, where the air is more pure.

If his circumſtances will not admit of travelling to Italy or France for a purer air, he ſhould burn juniper-wood in his chimney, or throw amber on live coals. The patient ſhould alſo uſe exerciſe, not indulge himſelf in much ſleep, be temperate in his diet, and feed upon aliment of eaſy digeſtion.

Our author ventures to affirm, that mineral waters are an univerſal remedy for the ſcurvy; but the cure is ſtill more certain, if an accurate regimen be obſerved, and the waters aſſiſted by the repeated exhibition of proper antiſcorbutic and balſamic medicines. When theſe cannot be had, pure light fountain-water, wherein hot iron has been extinguiſhed, may be ſubſtituted in their room.

Beſides mineral waters, nothing is more effectual in correcting a ſcorbutic acrimony, than a milk-diet, or whey, or whey impregnated with the juices of

of antiſcorbutic herbs, as ſcurvy-graſs and water-creſſes.

Scurvy-graſs and all the ſpecies of garden and water-creſſes, horſe-radiſh, the roots of wild-radiſh, and muſtard, are juſtly looked upon as antiſcorbutics, for they induce a ſurpriſing change both in the diſordered fluids and ſolids. To theſe may be added the roots of gentian and ſuccory, the leaves of ſcordium, carduus benedictus, wormwood, the leſſer centaury, water-treſoil, or bucks-beans: balſamics and corroboratives, as juniper-berries, the tops of fir and pine-trees, winters-bark, cortex elutheriæ, and the Peruvian bark: the gums ammoniac, ſagapenum, and galbanum; and the woods ſaſſafras, guaiacum, and aloes.

Medicines which allay the pains and ſpaſms, are the fat of animals, cream, oil of ſweet almonds, ſperma ceti, caſtor, aſſa fœtida, extracts of yarrow and chamomile, diaſcordium, ſaffron, earth-worms, elk-hoof, &c.

As to evacuations, bleeding ſhould be uſed with the greateſt caution; and none but the gentleſt purges ſhould be uſed, ſuch as ſenna, rhubarb, or manna; alſo pills made after the manner of Becher, with depurated aloes, extract of rhubarb, bitter herbs, and temperate balſamic ingredients.

The diuretics ſhould not be ſtronger than the decoction of the roots of parſley, celery, fennel, and aſparagus.

The ſafeſt diaphoretics are dulcified ſpirit of nitre, flowers of ſulphur, æthiops mineral, infuſions in the manner of tea of Paul's betony, carduus benedictus, ſcordium, and elder-flowers, diaphoretic antimony, calcined and uncalcined hartſhorn, amber, native cinnabar, cinnabar of antimony, and compound powder of crabs-claws: theſe things are adapted to a cold ſcurvy. But in the hot or alkaline, ſcurvy-graſs is too hot to be adminiſtered alone; wherefore it ſhould be corrected with acids, ſuch as wood-ſorrel, the juices of citrons, oranges, barberries, and pomegranates; this ſhould be accompanied with milk-meats, almond emulſions, barley-broths, water-gruel, chicken-broths, with endive, lettuce, ſorrel, and creſſes, at intervals.

When the ſcurvy proceeds from muriatic ſalts, which happens to thoſe who live on ſmoked or high-ſalted fiſh or fleſh, then whey, copiouſly drank, produces good effects; as alſo citrons, China-oranges, and ripe fruits; whereas ſpirituous and volatile antiſcorbutics are generally detrimental.

Heiſter ſays, that when there is a continual ſalt taſte in the mouth, lime-water drank morning and evening, is a high ſpecific. The late biſhop of Cloyne ſays, that if he may truſt what trials he has been able to make, tar-water is good in the ſeveral ſorts of ſcurvy, whether alkaline, acid, or muriatic; and that he believes it to be the only medicine that cures them all, without doing hurt in any. See the article TAR-WATER.

In a high degree of the ſcurvy mercurial ſalivation is looked upon by many as the only cure; which, by the vehement ſhock it gives the whole frame, and the ſenſible ſecretion it produces, may be thought to be more adequate to ſuch an effect; but the diſorder occaſioned by that violent proceſs, it is to be feared may never be got over.

SCURVY-GRASS, *Cochlearia*, in botany. See the article COCHLEARIA.

SCUTAGE was antiently a tax impoſed on ſuch as held lands, &c. by knight's ſervice, towards furniſhing the king's army: hence ſcutagio habendo was a writ that lay for the king, or other lord, againſt tenants holding by knight's ſervice, to ſerve in perſon, or ſend a ſufficient man in their room, or pay a certain ſum, &c.

SCUTELLARIA, ſkull-cap, in botany, a genus of didynamious plants, the flower of which is monopetalous and ringent, the tube is very ſhort and reflexed backwards, the chaps are long and compreſſed, the ſuperior lip is concave and trifid; the middle ſegment being concave and emarginated with the ſide ones plane, and the lower lip broad and indented; there is no pericarpium but, the cup, which is monophyllous and helmet ſhaped, contains four roundiſh ſeeds which are covered up in it. This genus is the ſame as the caſſida of Tournefort.

SCUTIFORME os, in anatomy, the chief bone of the knee, called alſo patella, mola, &c. See the article PATELLA.

SCUTIFORMIS CARTILAGO, in anatomy, one of the cartilages of the larynx, the broadeſt and biggeſt of them all, called alſo thyroides.

This cartilage is of a quadrangular figure, and ſtands in the interior part, where the pomum Adami makes its prominence, whence it is ſometimes called the anterior cartilage. It is gibbous without-ſide, and hollow within; ſometimes double, chiefly in women, in whom it does not advance ſo far forward as in men.

SCUTTLES, in a ſhip, ſquare holes cut in the deck, big enough to let in the body of a man, ſerving to let people down into any room below, upon occaſion, or from one deck to another. They are generally before the main-maſt, before the knight in the fore caſtle; in the gun room, to go down to the ſtern ſheets; in the round-houſe, to go down into the captains cabin, when forced by the enemy in a fight aloft. There are alſo ſome ſmaller ſcuttles, which have gratings over them: and all of them have covers, that people may not fall down through them in the night.

Scuttle is alſo a name given thoſe little windows and long holes which are cut out in cabins, to let in light.

SCYTALA, in mechanics, a term uſed by ſome writers, for a kind of radius, or ſpoke, ſtanding out from the axis of a machine, as an handle or lever ro turn it round and work it by.

SCYTALA LACONICA, a ſtratagem or device of the Lacedemonians, for the ſecret writing of letters to their correſpondents, ſo that if they ſhould chance to be intercepted, no body might be able to read them. To this end they had two wooden rollers or cylinders, perfectly alike and equal, one whereof was kept in the city, and another by the perſon to whom the letter was directed. For the letter, a ſkin of a very thin parchment was wrapped round the roller, and thereon was the matter written; which done it was taken off, and ſent away to the party, who, upon putting it in the ſame manner upon his roller, found the lines and words in the very ſame diſpoſition as when they were firſt written.

SEA, *Mare*, is frequently uſed for that vaſt tract of water encompaſſing the whole earth; but is more properly a part or diviſion of theſe waters, and is better defined a leſs aſſemblage of water, which lieth before and waſheth the coaſts of ſome particular countries, from whence it is generally denominated, as the Iriſh ſea, the Mediterranean ſea, the Arabian ſea, &c.

SEA-MEN, ſuch as are reſerved to ſerve the king, or other perſons, at ſea, who may not depart without licenſe, &c. Seamen fighting, quarrelling, or making any diſturbance, may be puniſhed by the commiſſioners of the navy, with fine and impriſonment. Regiſtered ſea-men are exempted from ſerving in any pariſh office, &c. and are allowed bounty money beſides their pay. By the law of merchants the ſeamen of a veſſel are accountable to the maſter or commander, and the maſter to the owners, and the owners to the merchants, for damage ſuſtained either by negligence or otherwiſe. Where a ſeaman is hired for a voyage, and he deſerts it before it is ended, he ſhall loſe his wages; and in caſe a ſhip be loſt by a tempeſt, or in a ſtorm, the ſea-men loſe their wages, as well as the owners their freight. See NAVALAFFAIRS.

SEA-HOLLY, *Eringium*, in botany. See ERYNGIUM.

SEA-ONION, See the article SCILLA.

SEA-WEED, *Fucus*. See the article FUCUS.

SEAL, *Sigillum*, a puncheon, or piece of metal, or other matter, uſually either round or oval, whereon are engraven the arms, device, &c. of ſome prince, ſtate, community, magiſtrate, or private perſon, often with a legend or ſubſcription, the impreſſion whereof in wax, ſerves to make acts, inſtruments, &c. authentic.

Before the time of William the conqueror, the the makers of all deeds only ſubſcribed their names, adding the ſign of the croſs, and a great number of witneſſes; but that monarch and the nobility uſed ſeals with their arms on them, which example was afterwards followed by others. The colour of the wax wherewith this king's grants were ſealed was uſually green, to ſignify that the act continued freſh for ever, and of force.

A ſeal is abſolutely neceſſary in reſpect of deeds, becauſe the ſealing of them makes perſons parties thereto, and without being ſealed they are void in law. It is held, that if a ſeal be broken off, it will render the deed void, and that where ſeveral are bound in a bond, the pulling off the ſeal of one vacates it as to all the reſt.

The king's great ſeal is that whereby all patents, commiſſions, warrants, &c. coming from the king are ſealed. The keeping hereof is in the hands of the lord high chancellor, who is hence denominated lord keeper. Indeed there is ſome difference between the lord chancellor and lord keeper, not in office, but in the manner of creation, the latter being made by the delivery of the great ſeal to him by the king, but the former having a patent. The king's privy ſeal is uſually firſt ſet to grants that are to paſs the great ſeal. See KEEPER.

SEAL is alſo uſed for the wax or lead and the impreſſion thereon, affixed to the thing ſealed.

SEALER, an officer in chancery appointed by the lord chancellor or keeper of the great ſeal, to ſeal the writs and inſtruments there made in his preſence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall with plaſter, mortar, cement, lead, and other ſolid binding. For ſtaples, hinges and joints, plaſter is very proper.

SEALING-WAX. See the article WAX.

SEAM or SEME *of Corn*, is a meaſure of eight buſhels.

SEAM *of Glaſs*, the quantity of 120 pounds or 24 ſtones, each five pounds weight. The ſeam of wood is an horſe load.

SEAMS *of a ſhip*, are places where her planks meet and join together. There is alſo a kind of peculiar ſeam in the ſowing of ſails, which they call monk-ſeam; the other ſeam of a ſail is the round ſeam, ſo called from its being round like the common ſeams.

SEARCHER. See the article ALNAGER.

Searcher is alſo an officer of the cuſtoms, whoſe buſineſs is to ſearch and examine all ſhips outward bound, to ſee whether they have any prohibited or unaccuſtomed goods on board.

SEAR-CLOTH, or CERE-CLOTH, in ſurgery, a form of external remedy ſomewhat harder than an unguent, yet ſofter than an emplaſter, though it is frequently uſed both for the one and the other. The ſear-cloth is always ſuppoſed to have wax in its compoſition, which diſtinguiſhes and even denominates it. In effect, when a liniment or unguent has wax enough in it, it does not differ from a ſear-cloth. Sear-cloths are a kind of ſubſtitutes to friction, and are ſometimes uſed for other purpoſes; the beſt are compounded of reſolvent drugs, as ſaffron, myrrh, and aloes, incorporated with wax and gums, as galbanum, gum ammoniac, and ſagapenum, the whole tempered with wine.

SEASIN,

SEASIN, or SEASING, in a ſhip, the name of a rope by which the boat rides by the ſhip's ſide when in harbour, &c.

SEASONS, in coſmography, certain portions or quarters of the year, diſtinguiſhed by the ſigns which the earth then enters, or by the meridian altitudes of the ſun, conſequent on which are different temperatures of the air, different works in tillage, &c. The year is divided into four ſeaſons, ſpring, ſummer, autumn, and winter. The beginnings and endings of each whereof, ſee under its proper article, SPRING, &c.

SEASONING *of Timber*. See TIMBER.

SEAT, in aſtronomy. See SHEAT.

SEAT, in the manege, the poſture or ſituation of a horſeman upon the ſaddle.

SEBESTEN, *Cordia*, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is patulous, the length of the cup, and the top, is divided into four, five, or ſix, obtuſe erect ſegments; it includes five ſubulated filaments topped with oblong antheræ: the fruit is a dry globoſe acuminated drupe, covered with the cup, containing a furrowed nut with four cells.

The fruit of a ſpecies belonging to this family of plants, are brought from Syria, and Egypt, and are uſed in medicine: they are moderately cooling and emollient, and help to obtund the acrimony of the humours; they are therefore recommended in defluxions, catarrhs, ſharpneſs of urine, bilious fevers and coſtiveneſs; but in the preſent medical practice are not much in uſe.

SECALE, Rye in botany. See the article RYE.

SECANT, in geometry, is a line that cuts another, or divides it into two parts. See the article LINE.

In trigonometry, the ſecant denotes a right line drawn from the center of a circle which cutting the circumference, proceeds till it meets with a tangent to the ſame circle.

SECOND, in geometry, chronology, &c. the ſixtieth part of a prime or minute, whether of a degree or of an hour: it is denoted by two ſmall accents, thus (″). See DEGREE, HOUR, MINUTE, &c.

SECOND, in muſic, one of the muſical intervals; being only the difference between any found and the next neareſt found, whether above or below it. See the article INTERVAL.

SECONDARY, in general, ſomething that acts as ſecond, or in ſubordination to another.

Secondary circles of the ſphere, are circles paſſing through the poles of ſome great circle: thus the meridians and hour-circles are ſecondaries to the equinoctial.

There are alſo ſecondaries paſſing through the poles of the ecliptic, by means of which all ſtars are referred to the ecliptic. See the articles ECLIPTIC, LONGITUDE, SPHERE, &c.

SECRETARY, an officer, who, by his maſter's orders, writes letters, diſpatches, and other inſtruments, which he renders authentic by his ſignet.

Of theſe there are ſeveral kinds; as, 1. Secretaries of ſtate, who are officers that have under their management and direction the moſt important affairs of the kingdom, and are obliged conſtantly to attend on the king: they receive and diſpatch whatever comes to their hands, either from the crown, the church, the army, private grants, pardons, diſpenſations, &c. as likewiſe petitions to the ſovereign, which, when read, are returned to them; all which they diſpatch according to the king's direction.

2. Secretary of an embaſſy, a perſon attending an ambaſſador for writing diſpatches relating to the negociation.

There is a great difference between the ſecretary of an embaſſy, and the ambaſſador's ſecretary; the laſt being a domeſtic or menial of the ambaſſador, and the firſt, a ſervant or miniſter of the prince.

3. Secretary of war, an officer of the war-office, who has two chief clerks under him, the laſt of which is the ſecretary's meſſenger.

There are alſo ſecretaries in moſt of the other offices.

SECRETION, *Secretion*, in the animal œconomy, the ſeparation of ſome fluid mixed with the blood by means of the glands. See the article GLAND.

In the bodies of animals we obſerve a great number of juices of different natures, viz. the blood, lympha, ſaliva, ſtomach-liquor, inteſtinal juices, pancreatic juice, bile, urine, &c. and the blood is the general ſourſe of all. See the articles BLOOD, LYMPH, &c.

The manner in which this ſecretion is performed has been greatly enquired into for a century paſt; but as the exceeding minuteneſs of the organs whereby ſecretion is effected prevents any regular ſearch, various authors have imagined various methods for explaining it.

The ancient phyſicians contented themſelves only with aſſerting certain particular virtues or faculties inherent in the viſcera, whereby they were determined to ſeparate one liquor rather than another. Some of the moderns, full of the effects they have obſerved from fermentations, maintain, that there are ferments in the ſeveral parts, by the aid whereof certain kinds of particles mixed in the blood are ſeparated therefrom, after the ſame manner as we ſee in muſt or new wine, from which, while fermenting, certain parts are detached in form of froth.

Others conſider the glands as kinds of ſieves, whoſe holes having different figures, will only let paſs certain particles or molecules, whoſe figures reſemble thoſe of the holes; but the many inconveniencies which both theſe ſuppoſitions have to grapple withal, made ſome naturaliſts have recourſe to what

what is called imbibition: theſe maintain, that beſides the different diameters of the pores, it is required that the ſeveral parts be already imbued or moiſtened with a liquor like to that they are to filtre.

This opinion Winſlow adopted; and not ſatisfied with conjectural principles, applied himſelf to experiments, in order to inveſtigate the manner wherein ſecretion is performed, and lays it down thus: It is well known that a piece of brown-paper (which is only an aſſemblage of ſmall fibres compacted cloſe to each other) having once imbibed oil or water, will never let any other liquor paſs through it but of the ſame kind with what it is impregnated with; all others it ſtops. Now, in the ſecretory ducts of the glands we find a parallel ſtructure, an aſſemblage of fine threads or filaments bound cloſe together, much as in brown-paper, &c. only differently diſpoſed; this plexus then having once imbibed a certain juice, will not let paſs any of the liquors which arrive at the orifices of theſe ducts, but that which it had firſt imbibed: the cauſe of this phænomenon is referred to the attraction of coheſion, which is found ſtronger between the homogeneous than the heterogeneous parts of the ſame fluid.

As the blood, then, is not a homogeneous liquor, but a compound of an infinity of different parts or molecules, ſome oily, others mucilaginous, aqueous, ſaline, ſubtile, groſs, &c. in its motion along the arteries of the gland, it becomes divided into all the little ramifications thereof, by which means its velocity is exceedingly abated, and the molecules are obliged to go off, one by one, through the narrow paſſage of the artery into the vein, and of conſequence to paſs over the orifice of the ſecretory ducts of the glands, whoſe down is already tinged with a juice of a certain nature: ſuch of the molecules, therefore, as are found of the ſame nature with the juice they met withal at the entrance of the ſecretory duct, join themſelves to them, and entering the ducts, are driven on by others that follow them, and are at length driven into the excretory duct. But how theſe parts ſhould have firſt imbibed the particular juices neceſſary for their reſpective ſecretions, is the queſtion. Mr. Winſlow thinks it probable that they had been imbued with the juices they were to filtrate at the firſt formation of the animal, or at the time when the ſolid parts were framed.

Kiel accounts for ſecretion from the joint conſideration of the different diameters of the veſſels, the different velocity of the blood, the different angles the ducts make with the arteries, and the different attraction of the various parts under all theſe different circumſtances.

It is obſerved, that in this theory there is ſomething arbitrary and conjectural; beſides, that the reaſoning is carried on to ſuch a length, that in a thing, the principles whereof are ſo obſcure, the parts or organs ſo imperfectly known, and the whole proceſs carried on out of ſight, the mind cannot ſafely acquieſce in it.

Hales makes it evident from experiments, that the animal ſecretions are not made with the full force of the arterial blood, but more gradually and ſparingly, ſo as to be carried forward in thoſe very fine veſſels by an alternate pulſive force of the arterial fluid, and attractive power of the fine ſecerning veſſels, aſſiſted alſo by conſtant vibrations; for the animal fluids and ſolids are in an inceſſant mutually-vibrating ſtate.

In this manner, doubtleſs, the plentiful ſecretions are made into the ſtomach and guts, as alſo in the pancreas, meſenteric, ſalival, and other glands of the body; and thus alſo the perſpiring matter is carried off, not by the more protruſive force of the arterial blood alone, but alſo by the warmth and mutual action of the fluids and ſolids. See PERSPIRATION, &c.

For the uſe, &c. of the animal ſecretions, ſee EXCRETION and EXCREMENT.

SECT, *Secta*, a collective term, comprehending all ſuch as follow the doctrines and opinions of ſome famous divine, philoſopher, &c. See the articles HERESY and SCHISM.

The principal ſects among the ancient philoſophers were the Epicureans, Peripatetics, Academics, Stoics, Pyrrhoniſts, &c. See the article EPICUREANS.

Among the moderns, the Newtonians, Carteſians, &c. are the principal ones in Europe. See NEWTONIAN.

And the Calviniſts, Lutherans, Papiſts, Anabaptiſts, Arians, Socinians, Arminians, &c. are the principal ſects to be found among modern divines. See CALVINISTS, &c.

SECTION, in general, denotes a part of a divided thing, or the thing itſelf. Such, particularly, are the ſubdiviſions of a chapter; called alſo paragraphs and articles: the mark of a ſection is §.

SECTION, in geometry, denotes a ſide or ſurface appearing of a body or figure cut by another; or the place where lines, planes, &c. cut each other.

The common ſection of two planes is always a right line; being the line ſuppoſed to be drawn on one plane by the ſection of the other, or by its entrance into it.

SECTION *of a Building*, in architecture, is the ſame with its profile; or a delineation of its heights and depths raiſed on a plane, as if the fabric was cut aſunder to diſcover its inſide.

Conic SECTIONS, in geometry. See the articles CONE and CONIC.

SECTOR, in geometry, is a part of a circle, comprehended between two radii and the arch; or it is a mixed triangle, formed by two radii and the arch of a circle. See the articles CIRCLE, ARCH, RADIUS, TRIANGLE, &c.

For the method of finding the area of a ſector, as well as the ſectment of a circle, ſee the article SEGMENT.

SECTOR is alſo a mathematical inſtrument, of great uſe in finding the proportion between quantities of the ſame kind, as between lines and lines, ſurfaces and ſurfaces, &c. for which reaſon the French call it the compaſs of proportion.

The great advantage of the ſector above common ſcales, &c. is, that it is adapted to all radii, and all ſcales. For, by the line of chords, ſines, tangents, &c. on the ſector, we have lines of chords, ſines, tangents, &c. adapted to any radius between the length and breadth of the ſector, when opened.

Deſcription of the SECTOR. This inſtrument conſiſts of two equal legs, or rules of braſs, &c. riveted together, but ſo as to move eaſily on the rivet; on the faces of the inſtrument are placed ſeveral lines; the principal of which are the line of equal parts, line of chords, line of ſines, line of tangents, line of ſecants, and line of polygons.

The line of equal parts, called alſo the line of lines, marked L, is a line divided into a 100 equal parts, and, where the length of the leg will admit it, each of theſe is ſubdivided into halves and quarters. It is found on each leg, on the ſame ſide, and the diviſions numbered 1, 2, 3, 4, 5, &c. to 10, which is near the extremity of each leg. Note, in practice, 1 repreſents either 1, 10, 100, 1000, 10000, &c. as occaſion requires, in which caſe, 2, repreſents 2, 20, 200, 2000, 20000, &c. and ſo of the reſt. The line of chords, marked C on each leg, is divided after the uſual manner, and numbered 10, 20, 30, &c. to 60. The line of ſines, denoted on each leg by the letter S, is a line of natural ſines, numbered 10, 20, 30, &c. to 90. The line of tangents, denoted on each leg by the letter T, is a line of natural tangents, numbered 10, 20, 30, &c. to 45. Beſides which there is another little line of tangents on each leg, commencing at 45°, and extending to 79°, denoted by the letter *t*. Line of ſecants, denoted on each leg by the letter *ſ*, is a line of natural ſecants, numbered 10, 20, 30, &c. to 75, not commencing at the center of the inſtrument, but at ſome diſtance therefrom. The line of polygons, denoted by the letter P on each leg, is numbered 4, 5, 6, &c. to 12, which falls conſiderable ſhort of the center of the inſtrument. See CHORD, SINE, &c.

Uſe of the Line of equal Parts on the SECTOR.

1. To divide a given line into any number of equal parts, ſuppoſe ſeven. Take the given line in your compaſſes, and ſetting one foot in a diviſion of equal parts, that may be divided by ſeven, for example, 70, whoſe ſeventh part is 10, open the ſector till the other point falls exactly on 70, in the ſame line on the other leg. In this diſpoſition, applying one part of the compaſſes to 10, in the ſame line, ſhut them till the other fall in 10, in the ſame line, on the other leg, and this opening will be the ſeventh part of the given line. Note, if the line to be divided be too long to be applied to the legs of the ſector, divide only one half, or one fourth, by 7, and the double or quadruple thereof will be the ſeventh part of the whole.

2. To meaſure the lines of the perimeter of a polygon, one of which contains a given number of equal parts. Take the given line in your compaſſes, and ſet it parallel, upon the line of equal parts, to the number on each leg expreſſing its length. The ſector remaining thus, ſet off the length of each of the other lines parallel to the former, and the numbers each of them falls on, will expreſs their lengths.

3. A right line being given, and the number of parts it contains, ſuppoſe 120, to take from it a ſhorter line, containing any number of the ſame parts, ſuppoſe 25. Take the given line in your compaſſes, open the ſector till the two feet fall on 120 on each leg; then will the diſtance between 25 on one leg, and the ſame number on the other, give the line required.

4. To multiply by the line of equal parts on the ſector. Take the lateral diſtance from the center of the line to the given multiplicator; open the ſector till you fit that lateral diſtance to the parallel of 1 and 1, or 10 and 10, and keep the ſector in that diſpoſition; then take in the compaſſes the parallel diſtance of the multiplicand, which diſtance, meaſured laterally on the ſame line, will give the product required. Thus, ſuppoſe it were required to find the product of 8, multiply by 4: take the lateral diſtance from the center of the line to 4 in your compaſſes, i. e. place one foot of the compaſſes in the beginning of the diviſions, and extend the other along the line to 4. Open the ſector till you fit this lateral diſtance to the parallel of 1 and 1, or 10 and 10. Then take the parallel diſtance of 8, the multiplicand; i. e. extend the compaſſes from 8, in this line, on one leg, to 8 in the ſame line on the other, and that extent, meaſured laterally, will give the product required.

5. To divide by the line of equal parts on the ſector. Extend the compaſſes laterally from the beginning of the line to 1, and open the ſector till you fit that extent to the parallel of the diviſor; then take the parallel diſtance of the dividend, which extent, meaſured in a lateral direction, will give the quotient required. Thus ſuppoſe it was required to divide 36 by 4; extend the compaſſes laterally, the beginning of the line to 1, and fit to that extent the parallel of 4, the diviſor; then extend the compaſſes parallel, from 36 on one leg to 36 on the other, and that extent, meaſured laterally, will give 9, the quotient required.

6. To work any proportion by the ſector. Take the ſecond term lateral, and, opening the ſector, apply that extent parallel in the firſt term,

and ſtay the ſector in that poſition; then take the parallel diſtance of the third term, which extent, meaſured laterally, gives the fourth term required. This is ſo eaſy, from what has already been ſaid, that it needs no example.

The Uſe of the Line of Chords on the SECTOR.

1. To open the ſector ſo as the two lines of chords may make an angle or number of degrees, ſuppoſe 40. Take the diſtance from the joint to 40, the number of the degrees propoſed, on the line of chords; open the ſector till the diſtance from 60 to 60, on each leg, be equal to the given diſtance of 40; then with the two lines on the ſector form an angle of 40 degrees, as was required.

2. The ſector being opened, to find the degrees of its aperture. Take the extent from 60 to 60, and lay it off on the line of chords from the center; the number whereon it terminates will ſhew the degrees, &c. required.

3. To lay off any number of degrees upon the circumference of a circle. Open the ſector till the diſtance between 60 and 60 be equal to the radius of the given circle; then take the parellel extent of the chord of the number of degrees on each leg of the ſector, and lay it off on the circumferences of the given circle. Hence any regular polygon may be eaſily inſcribed in a given circle.

Uſe of the Line of Polygons on the SECTOR.

1. To inſcribe a regular polygon in a given circle. Take the ſemi-diameter of the given circle in the compaſſes, and adjuſt it to the number 6, on the line of polygons, on each leg of the ſector: then, the ſector remaining thus opened, take the diſtance of the two equal numbers, expreſſing the number of ſides the polygon is to have; e. gr. the diſtance from 5 to 5 for a pentagon, from 7 to 7 for a heptagon, &c. Theſe diſtances carried about the circumference of the circle, will divide it into ſo many equal parts.

2. To deſcribe a regular polygon, e. gr. a pentagon, on a given right line. Take the length of the line in the compaſſes, and apply it to the extent of the number 5, 5, on the lines of polygons. The ſector thus opened, upon the ſame lines, take the extent, from 6 to 6; this will be the ſemi-diameter of the circle the polygon is to be inſcribed in. If, then, with this diſtance, from the ends of the given line, you deſcribe two arches of a circle, their interſection will be the center of the circle.

3. On a right line, to deſcribe an iſoſceles triangle, having the angle at the baſe double that at the vertex. Open the ſector, till the ends of the given line fall on 10 and 10 on each leg; then take the diſtance from 6 to 6. This will be the length of the two equal ſides of the triangle.

Uſe of the Lines of Sines, Tangents, and Secants, on the SECTOR.

By the ſeveral lines diſpoſed in the ſector, we have ſcales to ſeveral radiuſes; ſo that having a length or radius given, not exceeding the length of the ſector when opened, we find the chord, ſine, &c. thereto, e. gr. Suppoſe the chord, ſine, or tangent, of 10 degrees, to a radius of 3 inches, required; make 3 inches the aperture, between 60 and 60, on the lines of chords of the two legs; then will the ſame extent reach from 45 to 45 on the line of tangents, and from 90 to 90 on the line of the ſines on the other ſide; ſo that to whatever radius the line of chords is ſet, to the ſame are all the others ſet. In this diſpoſition, therefore, if the aperture between 10 and 10, on the lines of chords, be taken with the compaſſes, it will give the chord of 10 degrees. If the aperture of 10 and 10 be in like manner taken on the lines of ſines, it will be the ſine of 10 degrees. Laſtly, if the aperture of 10 and 10 be in like manner taken on the lines of tangents, it gives the tangent of 10 degrees.

If the chord, or tangent, of 70 degrees was required; for the chord, the aperture of half the arch, viz. 35, muſt be taken, as before; which diſtance, repeated twice, gives the chord of 70 degrees. To find the tangent of 70 degrees to the ſame radius, the ſmall line of tangents muſt be uſed, the other only reaching to 45: making, therefore, 3 inches the aperture between 45 and 45 on the ſmall line; the extent between 70 and 70 degrees on the ſame, will be the tangent of 70 degrees to 3 inches radius.

To find the ſecant of an arch, make the given radius the aperture between 0 and 0 on the line of ſecants: then will the aperture of 10 and 10, or 70 and 70, on the ſaid lines, give the tangent of 10°, or 70°.

If the converſe of any of theſe things were required; that is, if the radius be required, to which a given line is the ſine, tangent, or ſecant, it is but making the given line, if a chord, the aperture on the line of chords, between 10 and 10, and then the ſector will ſtand at the radius required; that is, the aperture between 60 and 60, on the ſaid line, is the radius. If the given line were a ſine, tangent, or ſecant, it is but making it the aperture of the given number of degrees; then will the diſtance of 90 and 90 on the lines, of 45 and 45 on the tangents, of 0 and 0 on the ſecants, be the radius.

SECULAR, ſomething that is temporal, in which ſenſe the word ſtands oppoſed to eccleſiaſtical: thus we ſay, ſecular power, ſecular juriſdiction, &c.

Secular is more peculiarly uſed for a perſon who lives at liberty in the world, not ſhut up in a monaſtery, nor bound by vows, or ſubjected to the particular rules of any religious community; in which ſenſe it ſtands oppoſed to regular. The Romiſh clergy is divided into ſecular and regular.

SECULAR GAMES, *Ludi Seculares*, in antiquity, ſolemn games held among the Romans once in an age. Theſe games laſted three days and as many nights,

nights, during which time ſacrifices were performed, theatrical ſhews exhibited, with combats, ſports, &c. in the circus. The occaſion of theſe games, according to Valerius Maximus, was to ſtop the progreſs of a plague. The firſt who had them celebrated at Rome was Valerius Publicola, the firſt conſul created after the expulſion of the kings. The ceremonies to be obſerved therein were found preſcribed in one of the books of the Sibyls. At the time of the celebration of the ſecular games, heralds were ſent throughout all the empire, to intimate that every one might come and ſee thoſe ſolemnities which he never yet had ſeen, nor was ever to ſee again. Authors are not agreed as to the number of years wherein theſe games where returned, partly becauſe the quantity of an age or ſeculum, among the antients, is not known, and partly on other accounts; ſome will have it that they were held every hundred years, and that the ſeculum or age was our century.

SECULAR POEM, *Carmen ſeculare*, a poem ſung or rehearſed at the ſecular games, of which kind we have a very fine piece among the works of Horace, being a ſapphic ode at the end of his epodes.

SECULARIZATION, the act of converting a regular perſon, place, or benefice into a ſecular one.

SECUNDINES, *Secundinæ*, *after birth*, in anatomy, the ſeveral coats or membranes wherein the fœtus is wrapped up in the mother's womb, as the chorion and amnios, with the placenta, &c. See the articles CHORION, AMNIOS, PLACENTA, ALLANTOIS, &c.

SEDANTIA, ſedative medicines, in pharmacy, ſuch medicines as are poſſeſſed of a power not only of compoſing, checking, and allaying the exorbitant and irregular motions of the ſolids and fluids, but alſo of alleviating and reſolving the painful ſpaſmodic ſtructures of the parts.

As the effect of theſe medicines are very extenſive, we may juſtly include in their number paregorics, which not only relax and gently ſooth the rigid fibres, but alſo obtund the acrimony of the juices; anodynes, which alleviate the violence of racking pains; antiſpaſmodics, which mitigate and remove the ſpaſmodic ſtructures of the parts; antiepileptics, which check convulſive motions; hypnotics, which procure ſleep; and narcotics, which induce a conſiderable ſtupor of the ſenſes and torpor of all the motions of the body. See PAREGORIC, ANODYNE, ANTISPASMODIC, &c.

SE DEFENDENDO, in law, a plea uſed for him that is charged with the death of another, by alledging that he was under a neceſſity of doing what he did in his own defence; as that the other aſſaulted him in ſuch a manner, that if he had not done what he did, he muſt have been in hazard of his own life. But here the danger muſt appear ſo great, as to be inevitable. Any perſon in his juſt defence may kill others for the ſafety of his life; though if malice be coloured under a pretence of neceſſity, or one kill another before he is under a neceſſity of ſo doing, the ſame may be either murder or manſlaughter by our law. See the articles MURDER and MANSLAUGHTER.

Where two perſons ſuddenly fall out, and one of them, being attacked, flies to the wall, or any unpaſſable place, as far as he can, in order to ſave his life, but being ſtill purſued, kills the perſon that attacked him, this killing, as well as others in the like caſes, is ſe defendendo. In ſe defendendo, though the affair juſtifies the killing to have been in his own defence, he is nevertheleſs obliged to ſue out his pardon from the lord chancellor, which of courſe is granted him, but yet his goods and chattels become forfeited to the king. It is ſaid, however, that upon the ſpecial matter found, he may be diſmiſſed without any forfeiture, &c.

SEDIMENT, the ſettlement or dregs of any thing, or that groſs heavy part of a fluid body which, upon reſting, ſinks to the bottom of the veſſel.

SEDR, or SEDRE, the high prieſt of the ſect of Ali among the Perſians.

SEDUM, houſe-leek, in botany, a genus of plants, whoſe flower conſiſts of five plane lanceolated pointed petals, with five nectaria, each being a ſmall emarginated ſcale and inſerted on the back of the germen; the fruit conſiſts of five erecto-patent, acuminated, compreſſed capſules, emarginated at the baſe, and opening from top to bottom; the ſeeds are numerous and ſmall. This genus includes the orpine and ſtone-crop.

The common houſe-leek grows on the tops of old walls and houſes, it is evergreen, flowers in July, and the ſtalk withers in autumn. This plant is ſaid to be cooling, cleanſing, and aſtringent; and ſome give four ounces of the juice to cure intermittent fevers, when there is no cold fit; and the leaves are ſometimes uſed externally to cure the piles, but it muſt be done with caution.

SEED, *Semen*, in phyſiology, a ſubſtance prepared by nature, for the reproduction and conſervation of the ſpecies, both in animals and plants. See GENERATION.

The ſeed of animals, and particularly of mankind, is a whitiſh fluid, ſecreted from the blood in the teſtes. See TESTES.

It is the thickeſt and moſt elaborated of all the humours in the human body; and by a chemical analyſis, is found to conſiſt almoſt entirely of oil and volatile ſalts blended with a little phlegm.

The ſeminal liquor, however, ſuch as emitted for uſe, is a mixture of the true ſemen with the liquors of the proſtatæ, and other glands of the penis; all which, in the act of coition, are poured at the ſame time into the common canal of the urethra, either from the glands where they are ſecreted, or

the reſervoirs where they are kept; and being there blended together, are injected into the uterus. See CONCEPTION, FOETUS, &c.

SEED *of Vegetables*, is their laſt product whereby the ſpecies are propagated; being frequently the fruit of a plant, but ſometimes only a part included in the fruit.

Every ſeed conſiſts of an embryo-plant, called plantula-ſeminalis, with its covers.

The embryo, which is the whole future plant in miniature, is called the germ or bud; and is rooted in the cotyledon or placenta, which makes its involucrum or cover. The cotyledon is always double; and in the middle, and common center of the two, is a point or ſpeck, viz. the embryo plantule, which being acted on by the warmth of the ſun and of the earth, begins to protude its radicle or root downwards, and its bud upwards; and as the requiſite heat continues, it draws nouriſhment by the root, and ſo continues to unfold itſelf and grow.

The two placentulæ or cotyledons of a ſeed, are, as it were, a caſe to the little embryo-plant, covering it up, and ſheltering it from injuries, and feeding it from their own proper ſubſtance; which the plantule receives and draws to itſelf by an infinite number of little filaments, which it ſends in the body of the placenta.

The cotyledons, for the moſt part, abound with a balſam diſpoſed in proper cells; and this ſeems to be oil brought to its greateſt perfection, while it remains tumid, and lodged in theſe repoſitories: one part of the compoſition of this balſam is oily and tenacious, and ſerves to defend the embryo from any extraneous moiſture; and, by its viſcidity, to entangle and retain the fine, pure, volatile ſpirit, which is the ultimate production of the plant. This oil is never obſerved to enter into the veſſels of the embryo, which are too fine to admit ſo thick a fluid. The ſpirit, however, being quickened by an active power, may poſſibly breathe a vital principle into the juices that nouriſh the embryo, and ſtamp upon it the character that diſtinguiſhes the family; after which every thing is changed into the proper nature of that particular plant.

Now, when the ſeed is committed to the earth, the placenta ſtill adheres to the embryo for ſome time, and guards it from the acceſs of noxious colds, &c. and even prepares and purifies the cruder juice the young plant is to receive from the earth, by ſtraining it through its own body. This it continues to do till the embryo-plant, being a little enured to its new element, and its root tolerably fixed in the ground, and fit to abſorb the juice thereof, it then periſhes, and the plant may be ſaid to be delivered; ſo that nature obſerves the ſame method in plants contained in fruits, as in animals in the mother's womb.

Many ſorts of ſeeds will continue good for ſeveral years, and retain their vegetative faculty; whereas others will not grow after they are one year old; this difference is in a great meaſure owing to their abounding more or leſs with oil, as alſo to the nature of the oil, and the texture of the outward covering.

All ſeeds require ſome ſhare of freſh air, to keep the germen in a healthy ſtate; and where the air is abſolutely excluded, the vegetative quality of the ſeeds will ſoon be loſt. But ſeeds will be longeſt of all preſerved in the earth, provided they are buried ſo deep as to be beyond the influence of the ſun and ſhowers; ſince they have been found to lie thus buried twenty or thirty years, and yet vegetate as well as new ſeeds. How the vegetative life is ſo long preſerved, by burying them ſo deep in the ground, is very difficult to explain; but as the fact is very well known, it accounts for the production of plants out of earth, taken from the bottom of vaults, houſes, &c.

In the common method of ſowing ſeeds, there are many kinds which require to be ſown ſoon after they are ripe; and there are many others which lie in the ground a year, ſometimes two or three years, before the plants come up: hence when ſeeds brought from diſtant countries are ſown, the ground ſhould not be diſturbed, at leaſt for two years, for fear of diſtroying the young plants.

As to the method of preſerving ſeeds, the dry kinds are beſt kept in their pods or outer coverings; but the ſeeds of all ſoft fruits, as cucumbers, melons, &c. muſt be cleanſed from the pulp and mucilage which ſurround them, otherwiſe the rotting of theſe parts will corrupt the ſeeds.

When ſeeds are gathered, it ſhould always be done in dry weather; and then they ſhould be hung up in bags in a dry room, ſo as not to deprive them of air.

Diſpenſatory writers divide the ſeeds uſed in medicine into four claſſes: 1. The four greater hot ſeeds, viz. of aniſeed, fennel, carraway, and cummin. 2. The four leſſer hot ſeeds, viz. of biſhopsweed, ſtone-parſley, ſmallage, and wild-carrot. 3. The four greater cold ſeeds, viz. cucumber, cucurbit, citruls, and melons. 4. The four leſſer cold ſeeds, viz. endive, ſcariola, lettuce, and purſlain. See ANISE, FENNEL, &c.

But beſides theſe, there are many other ſeeds preſcribed for their medicinal virtues; as thoſe of coriander, dill, thlaſpi, muſtard, linſeed, fœnugreek, carthamus, navew, ricinus, ſorrel, pſyllium, ſtaveſacre, &c. See the articles CORIANDER, DILL, &c.

Change of SEED. Seed-wheat ſhould be brought from the crop on a ſtrong clay-land, whatever kind of land it is to be ſowed upon. A white clay is a good change for a red clay, and a red clay for a white; but whatever the land be, from which the ſeed is taken, it may be infected, if that be not changed there the preceding year; and then there may

may be danger, though it be had from ever ſo proper a land. It is a rule among the farmers, never to buy ſeed-wheat from a ſandy ſoil; they expreſs their diſlike of this by the coarſe rhyme, Sand is a change for no land. See the article CHANGE.

SEEDLINGS, among gardeners, are young plants which have not been tranſplanted from the beds where they were ſown: it is alſo a term uſed to diſtinguiſh plants raiſed of the ſeeds from thoſe of the ſame kinds which have been propagated by layers, cuttings, &c.

SEEDY, in the brandy-trade, a term uſed by the dealers, to denote a fault that is found in ſeveral parcels of French brandy, which renders them unſaleable. The French ſuppoſe that theſe brandies obtain the flavour which they expreſs by this name, from weeds that grow among the vines from whence the wine of which this brandy is made was preſſed. However it be, the thing is evident, and the taſte not of any one kind, ſome taſting ſtrongly of aniſeed, ſome of caraway-ſeed, and ſome others of the ſtrong flavoured ſeeds of plants. The buſineſs of rectification of ſpirits, Dr. Shaw obſerves, is very little underſtood abroad, though much practiſed with us; and there is no doubt but that the ſame means which we uſe to rectify malt ſpirits, would alſo ſerve to purify theſe brandies. See the article RECTIFICATION.

SEEING, the act of perceiving objects by the organ of ſight; or it is the ſenſe we have of external objects by means of the eye. See the article SIGHT.

SEELING, in the manege, a horſe is ſaid to ſeel when he begins to have white eye-brows, that is, when there grows on that part about the breadth of a farthing of white hairs, mixed with thoſe of his natural colour, which is a mark of old age. It is ſaid, that a horſe never ſeels till he is fourteen years old, and always does before he is ſixteen years. The light, ſorrel, and black, ſooner ſeel than any other. Horſe-jockeys uſually pull out thoſe hairs with pincers; but if there be ſo many, that it cannot be done without making the horſe look bald and ugly, then they colour their eye-brows, that they may not appear old.

SEELING, at ſea, is uſed in the ſame ſenſe nearly with heeling: when a ſhip lies down conſtantly, or ſteadily on one ſide, the ſeamen ſay, ſhe heels; and they call it ſeeling when ſhe tumbles violently and ſuddenly, by reaſon of the ſea forſaking her, as they call it, that is, the waves leaving her for a time in a bowling ſea. When a ſhip thus tumbles to leeward, they call it leeſeel; and in this there is not much danger, even in a ſtorm, becauſe the ſea will eaſily right her up again; but if ſhe rowls or ſeels to windward, there is fear of her coming over too ſhort or ſuddenly, and ſo having the ſea break right into her, be either foundered, or have ſome of her upper works carried away.

SEGMENT *of a Circle*, in geometry, that part of the circle contained between a chord and an arch of the ſame circle. See CIRCLE, ARCH, and CHORD.

SEGMENT *of a Sphere*, is a part of a ſphere terminated by a portion of its ſurface, and a plane which cuts it off, paſſing ſomewhere out of the center; being more properly called the ſection of a ſphere.

The baſe of ſuch a ſegment, it is evident, is always a circle for finding the ſolid contents of the ſegment of a ſphere. See the article FRUSTUM.

SEGMENT is ſometimes alſo extended to the parts of the ellipſes, and other curvilinear figures.

SEGMOIDAL *Valves*, in anatomy, little valves of the pulmonary artery, thus called from their reſembling ſegments of circles, but more uſually called ſemi-lunar valves.

SEGUIERIA, in botany, a genus of plants, whoſe flower hath no corolla, but conſiſts in a pentaphyllous patent cup, which is coloured and perſiſtent, and contains a great number of capillary patent filaments, terminated with oblong antheræ; the fruit is an oblong capſule, having one cell, and containing a ſmooth ſeed of the ſame form.

SEIGNIORY, *Dominium*, in our law, is uſed for a manor or lordſhip of a ſeigneur, or lord of the fee or manor.

SEIGNORAGE, ſignifies the right, or due belonging to a ſeigneur, or lord; but it is particularly uſed for a duty belonging to the prince, for the coining of money; called alſo coinage, which, under our ancient kings, was five ſhillings for every pound of gold brought in the maſs to be coined, and a ſhilling for every pound weight of ſilver. At preſent the king claims no ſeignorage at all, but the ſubject has his money coined at the public expence; nor has the king any advantage therefrom, but what he has from the alloy.

SEISIN, in law, ſignifies poſſeſſion. See the article POSSESSION.

In this ſenſe we ſay, premier ſeiſin, for the firſt poſſeſſion, &c. See PREMIER.

Seiſin is divided into that in deed or in fact, and that in law; a ſeiſin in deed is where a poſſeſſion is actually taken; but a ſeiſin in law is, where lands deſcend, and the party has not entered thereon; or in other words, it is, where a perſon has a right to lands, &c. and is by wrong diſſeiſed of them.

SEIZE, SEAZE, or SEASE, in the ſea-language, is to make faſt, or bind, particularly to faſten two ropes together, with rope-yarn. The ſeizing of a boat is a rope tied to a ring, or little chain in the foreſhip of the boat, by which means it is faſtened to the ſide of the ſhip.

SEIZURE, in commerce, an arreſt of ſome merchandize, moveable, or other matter, either in conſequence of ſome law, or of ſome expreſs order of the ſovereign. Contraband goods, thoſe fraudu-

lently entered, or landed without entering at all, or at wrong places, are ſubject to ſeizure. In ſeizures, among us, one half goes to the informer, and the other half to the king.

SELAGO, in botany, a plant which grows naturally at the Cape of Good Hope; it has ſlender ligneous ſtalks, which grow ſeven or eight feet in length, ſending out many ſlender branches, which are furniſhed with ſhort linear hairy leaves, which grow in cluſters; the flowers are produced in umbels at the top of the ſtalks, the general umbel being compoſed of a multiplicity of ſmall umbels; they are monopetalous and of a white colour, they have no pericarpium; but the ſeed, which is ſingle and roundiſh, is involved in the corolla.

SELAGO, is alſo a name by which Dillenius calls the lycopodium of Linnæus.

SELENDERS, in the manege, are chaps, or mangy ſores, in the bending of a horſe's hough, as the malanders are in the knees. See MALANDERS.

SELENOGRAPHY, a branch of coſmography, which deſcribes the moon and all the parts and appearances thereof, as geography does thoſe of the earth. See the article MOON.

SELEUCIDÆ, in chronology. Æra of the Seleucidæ, or the Syro-Macedonian æra, is a computation of time, commencing from the eſtabliſhment of the Seleucidæ, a race of Greek kings, who reigned as ſucceſſors of Alexander the Great, in Syria, as the Ptolemies did in Egypt. This æra we find expreſſed in the book of the Maccabees, and on a great number of Greek medals, ſtruck by the cities of Syria, &c. The rabbins call it the æra of contracts; and the Arabs, therik dilkarnain, that is, the æra of the two horns. According to the beſt accounts, the firſt year of this æra falls in the year 311 before Chriſt, being twelve years after Alexander's death.

SELINUM, in botany, a genus of umbelliferous plants, the general corolla whereof is uniform; the flowers conſiſt each of five unequal, inflexed, heart-ſhaped petals, with five capillary filaments, topped with roundiſh antheræ; there is no pericarpium, but the fruit is of an elliptic, oblong, compreſſed, and plane figure, channeled on each ſide, in the middle, and parting in two ſeeds, which are edged with membranes on their ſide.

SELL, in building, is of two kinds, viz. groundſell, which denotes the loweſt piece of timber in a timber-building, and that on which the whole ſuperſtructure is raiſed: and the window-ſell, called alſo window-ſoil, is the bottom piece in a window frame.

SEMETS, SUMMETS, or SUMMITS, in botany, the ſame with the antheræ. See the article ANTHERÆ.

SEMI, a word borrowed from the Latin, ſignifying *half*, but only uſed in compoſition with other words, as in the following articles.

SEMI-ARIANS, in church-hiſtory, a branch of the antient Arians, conſiſting of ſuch as in appearance condemned the errors of that hereſiarch, but yet acquieſced in ſome of the principles thereof, only palliating and concealing them under ſofter and more moderate terms. They would not allow, with the catholics, that the Son was homoouſios, *i. e.* of the ſame ſubſtance, but homoiouſios, *i. e.* of a like ſubſtance, with the Father; and thus, though, in expreſſion, they differed from the orthodoxy in a ſingle letter only, yet, in effect, they denied the divinity of Jeſus Chriſt, and placed him in the rank of creatures.

SEMI-CIRCLE, in geometry, half a circle, or that figure comprehended between the diameter of a circle and half the circumference.

SEMI-CIRCLE is alſo an inſtrument uſed in ſurveying, otherwiſe called graphometer.

SEMI-COLON, in grammar, one of the points or ſtops uſed to diſtinguiſh the ſeveral members of ſentences from each other. See PUNCTUATION.

The mark or character of the ſemicolon is (;) and has its name as being ſomewhat of leſs effect than a colon, or as demanding a ſhorter pauſe.

SEMI-CUBICAL *Parabola*, in the higher geometry, a curve of the ſecond order, wherein the cubes of the ordinates are as the ſquares of the abſciſſes. Its equation is $ax \times x = y^3$.

SEMI-CUPIUM, in medicine, an half bath wherein the patient is only placed up to the navel.

SEMI-DIAMETER, half the diameter, or a right line drawn from the center of a circle, or ſphere, to its circumference; being the ſame with what is otherwiſe called the radius. See RADIUS.

The diſtances, diameters, &c. of the heavenly bodies, are uſually eſtimated, by aſtronomers, in ſemi-diameters of the earth; and the diſtances of the ſecondary planets, from their reſpective primary ones, by ſemi-diameters of the body of the primary planet. See DISTANCE, DIAMETER, and PLANET.

SEMI-DOUBLE, in the Romiſh breviary, a term applied to ſuch offices and feſtivals as are celebrated with leſs ſolemnity than the double ones, but yet with more than the ſingle ones.

SEMIFISTULAR FLOWERS, among botaniſts, are ſuch whoſe upper part reſembles a pipe cut off obliquely, as in the ariſtolochia.

SEMIFLOSCULOUS, in botany, a term uſed to expreſs the flowers of a certain claſs of plants, of which the dandelion, hawk-weed, and the like, are kinds.

Theſe ſemifloſcules are petals, hollow in their lower part, but in their upper flat, and continued in the ſhape of a tongue. See FLOSCULOUS.

SEMI-

SEMI-LUNAR VALVES, in anatomy, are three ſmall valves, or membranes, of a ſemi-lunar figure, placed in the orifice of the pulmonary artery, to prevent the relapſe of the blood into the heart at the time of its dilatation. See the article HEART.

SEMI-MEMBRANOSUS, in anatomy, a long thin muſcle, partly tendinous; ſituated on the backſide of the thigh, a little towards the inſide; being one of the five flexors of the tibia. It ariſes from the tubercle of the iſchium.

SEMI-ORDINATE, in conics, &c. the half of an ordinate. See the article ORDINATE.

SEMI-PARABOLA, in geometry, a curve defined by the equation $ax^{m-1} = y^m$; as $ax^2 = y^3$, and $ax^3 = y^4$. See the article PARABOLA.

In ſemi-parabolas, $y^m : v^m :: ax^{m-1} : az^{m-1} = x^{m-1} : z^{m-1}$; or, the powers of the ſemi-ordinates are, as the powers of the ſemi-abſciſſes, one degree lower; for inſtance, in cubical ſemi-parabolas, the cubes of the ordinates are as the ſquares of the abſciſſes; that is, $y^3 : v^3 :: x^2 : z^2$.

SEMI-PELAGIANS, in church hiſtory, a branch of the Pelagians; ſo called, becauſe they pretended to keep a medium between the Pelagians and the orthodox. See PELAGIANS.

SEMI-TONE, in muſic, one of the degrees or concinnous intervals of concords.

The ratio of the ſemi-tone is 15 : 16. See the article TONE.

SEMINAL, *Seminalis*, in anatomy and medicine, ſomething belonging to the ſemen, or ſeed. See SEED.

SEMINARY, a kind of college, or ſchool, where youth are inſtruct d in the ceremonies, &c. of the ſacred miniſtry, of which there are many abroad; it being ordained, by the council of Trent, that there be a ſeminary belonging to each cathedral, under the direction of the biſhop.

SEMINARY, in gardening, denotes the ſeed plot, or place allotted for raiſing plants from ſeed, and keeping them till they are fit to be removed into the garden or nurſery.

When the ſeminary is intended for trees, it muſt be large, and of a ſoil adapted to the generality of the trees intended to be raiſed in it: but that which is moſt in uſe is for the ſupply of the flower garden, and is the place where flowers are to be raiſed from their ſeeds, to procure varieties; or, as the floriſts expreſs it, new flowers; as alſo for the ſowing all the biennial plants, to ſucceed thoſe which decay in the flower-garden.

The ſeminary ſhould always be ſituated at ſome diſtance from the houſe, and be walled or paled round, and kept under lock and key, to keep out dogs, &c. and to prevent a great deal of damage that is frequently done by thoſe who are not acquainted with gardening, before they are aware of it. The ſeveral directions for the management of the ſeminary, are to be ſeen under the names of the ſeveral plants intended to be raiſed in it.

SEMINATION, in natural hiſtory, denotes the manner, or act, of ſhedding and diſperſing the ſeeds of plants, which is effected ſeveral ways. Some are heavy enough to fall directly to the ground; others are furniſhed with a pappus, or down, that they may, by means thereof, be diſperſed by the wind; and others, again, are contained in elaſtic capſules, which burſting open with conſiderable force, dart or throw out the ſeeds to different diſtances.

SEMINERVOSUS, in anatomy, one of the flexor muſcles of the leg, which ariſes from the iſchium, and is inſerted into the upper part of the tibia.

SEMIS, in Roman antiquity, the half of an as. See the article AS.

SEMISPINALIS, or SEMISPINOSUS, in anatomy, one of the extenſor muſcles of the back and loins, has its origin from the os ſacrum and vertebræ of the loins, and its termination at the upper vertebræ of the thorax, eſpecially at the ſpinoſe apophyſes; it coheres very firmly to the longiſſimus dorſi and ſacro-lumbaris, the other two extenſors of the back and loins.

SEMITA LUMINOSA, a name given to a lucid tract in the heavens, which may be ſeen about ſix o'clock at night, a little before the vernal equinox, extending from the weſtern edge of the horizon up towards the pleiades.

Caſſini thinks this phænomenon ariſes from a vaſt number of ſmall planets encompaſſing the ſun, which give this light from reflection.

SEMPERVIVUM, in botany, a genus of plants, whoſe corolla conſiſts of ſix or twelve oblong, lanceolated, acute, concave petals, a little larger than the cup: the fruit conſiſts of twelve oblong, compreſſed, ſhort capſules, placed in an orbicular order, pointed outwards, opening within, and containing a number of roundiſh ſmall ſeeds.

This genus comprehends the African tree-houſeleek, a variety of which, with ſtriped leaves, is a very beautiful plant; it is propagated by cuttings in the ſummer months, and requires a hot-houſe in winter for its preſervation; but being very ſucculent, it ſhould have but little water given, leſt it ſhould rot, which it is apt to do when it has too much moiſture.

SENA, or SENNA, in botany. See the article SENNA.

SENATE, *Senatus*, in general, is an aſſembly or council of ſenators; that is, of the principal inhabitants of a ſtate, who have a ſhare in the government.

SENATOR, in general, denotes a member of ſome ſenate.

SENECA, or SENEGA. See SENEGA.

SE-

SENECIO, groundſel, in botany, a genus of plants, whoſe flower is compound and radiated; the corollulæ which form the diſc are numerous, tubulated, and hermaphrodite; the female florets which form the rays are ligulated, oblong, and tridentated: there is no pericarpium; but the ſeeds, which are crowned with down, are contained in the cup, and placed on a plane naked receptacle.

This genus includes the jacobæa of Tourneſort. The common groundſel is emollient and reſolvent, and taken in a ſtrong infuſion, proves emetic: it is preſcribed in ſmall doſes in the jaundice, dropſy, and hæmorrhages; and externally, it is uſed in ointments for diſorders of the ſkin.

SENEGA, *Seneca*, or *Seneka*, rattle-ſnake root, in the materia medica. See the article POLYGALA.

SENGREEN, in botany. See the article SEMPERVIVUM.

SENNA, or SENA, in botany, an annual plant, which grows naturally in Egypt; it riſes with an upright branching ſtalk, about a foot high; furniſhed with winged leaves, compoſed of four pair of ſmall lanceolated folioli, ending in acute points; the flowers are produced in looſe bunches at the top of the ſtalk; they are of a yellow colour, and compoſed of five roundiſh concave petals, with ten ſtamina, ſurrounding the ſtyle; when the flower is decayed, a roundiſh, incurved, compreſſed pod ſucceeds, having two cells, divided by an intermediate partition, each containing one or two ſeeds.

This plant is comprehended by Linnæus among the caſſias. See the article CASSIA.

The leaves of ſenna are annually imported from Alexandria, and are uſed in medicine; their ſmell is not very ſtrong, but the taſte is ſubacrid, bitteriſh, and nauſeous; they are one of the moſt common purgers of the ſhops, but are apt to gripe, unleſs given with proper correctives.

Authors greatly differ with regard to the humours ſenna brings away, which is a ſtrong proof of its operating univerſally: it has been greatly praiſed by ſome, for bringing away all noxious humours; and it is ſaid to be good in all chronic obſtructions, particularly in ſlow fevers, melancholy, the epilepſy, itch, and other diſorders of the ſkin.

Senna is not good in thoſe diſorders in which the fluids are hot, and the ſolids tend to an inflammation, eſpecially in hæmorrhages and diſorders of the breaſt.

Some authors are in doubt, whether the leaves of ſenna or the pods are beſt; there is, however, no great difference, only the pods are ſaid to gripe leaſt, and to be ſomewhat weaker as a purge. There are ſcarce any forms of cathartics in which ſenna is not an ingredient, and it is generally the principal in purgative diet-drinks, and medicated ales.

SENSATION, in philoſophy, the act of perceiving external objects by means of the ſenſes. See PERCEPTION, and the next article.

SENSE, a faculty of the ſoul, whereby it perceives external objects, by means of the impreſſions they make on certain organs of the body.

The organs of ſenſation are generally reckoned five, viz. the eye, whereby we ſee objects; the ear, which enables us to hear ſounds; the noſe, by which we receive the ideas of different ſmells; the palate, by which we judge of taſtes; and the cutis, or ſkin, which enables us to feel the different forms, hardneſs, or ſoftneſs, of bodies. See EYE, EAR, &c. as alſo VISION, HEARING, &c.

SENSATIVE SOUL, a denomination given to the ſouls of brutes, either as intimating its utmoſt faculty to be that of ſenſation; or becauſe it is ſuppoſed to be corporeal, ſo as to be an object of our ſenſes. See SOUL.

SENSITIVE, or SENSIBLE PLANT, *Mimoſa*, in botany. See MIMOSA.

SENSORY, *Senſorium Commune*, the ſeat of the common ſenſe, or what receives the impreſſions of all ſenſible objects, conveyed to it by the nerves of each particular organ, and conſequently is the immediate cauſe of perception.

This office is, by Dr. Willis, attributed to the ſtriated part of the brain; and by Des Cartes, to the glandula pinealis.

SENTENCE, in law, a judgment paſſed in court by the judge, on ſome proceſs, either civil or criminal.

SENTENCE, in grammar, a period or ſet of words, comprehending ſome perfect ſenſe or ſentiment of the mind.

SENTENCE, in poetry, is an inſtructive and lively remark made on ſomething very obſervable and agreeably ſurpriſing, which contains much ſenſe in a few words.

It is either direct or plain, as, "In all the affairs of the world, ſo much reputation is really ſo much power;" or indirect or diſguiſed, as,

"Fool, not to think how vain
Againſt th' Omnipotent to riſe in arms."

SENTIMENTS, in poetry, and eſpecially dramatic, are the thoughts which the ſeveral perſons expreſs, whether they relate to matters of opinion, paſſion, buſineſs, or the like.

SENTINEL, CENTINEL, or CENTRY, in military affairs, is a private ſoldier, placed in ſome poſt, to watch any approach of the enemy, to prevent ſurpriſes, and to ſtop ſuch as would paſs without order, or diſcovering who they are.

SEPARATISTS, an appellation given to diſſenters, from their ſetting up a ſeparate church from the eſtabliſhed one.

SEPTAS, in botany, a genus of plants, whoſe flower conſiſts of ſeven oblong equal petals, double the length of the cup, with ſeven ſtamina: the fruit conſiſts of ſeven oblong, acute, parallel, univalvular capſules, containing many ſeeds.

SEP-

SEPTEMBER, the ninth month of the year, conſiſting of only thirty days: it took its name as being the ſeventh month, reckoning from March, with which the Romans began their year.

SEPTENTRIO, in aſtronomy, a conſtellation more uſually called urſa minor. See URSA.

In coſmography, the term ſeptentrio denotes the ſame with north: and hence, ſeptentrional is applied to any thing belonging to the north, as ſeptentrional ſigns, parallels, &c.

SEPTUAGESIMA, in the calendar, denotes the third Sunday before Lent, or before quadrageſima Sunday: ſuppoſed by ſome to take its name from its being about ſeventy days before Eaſter.

SEPTUAGINT, the name given to a Greek verſion of the books of the Old Teſtament, from its being ſuppoſed to be performed by ſeventy-two Jews, who are uſually called the ſeventy interpreters, becauſe ſeventy is a round number.

The hiſtory of this verſion is expreſly written by Ariſteas, an officer of the guards to Ptolemy Philadelphus; the ſubſtance of whoſe account is as follows: Ptolemy having erected a fine library at Alexandria, which he took care to fill with the moſt curious and valuable books from all parts of the world, was informed that the Jews had one, containing the laws of Moſes, and the hiſtory of that people, and being deſirous of enriching his library with a Greek tranſlation of it, applied to the high-prieſt of the Jews; and to engage him to comply with his requeſt, ſet at liberty all the Jews, whom his father Ptolemy Soter had reduced to ſlavery. After ſuch a ſtep, he eaſily obtained what he deſired; Eleazar, the Jewiſh high-prieſt, ſent back his ambaſſadors with an exact copy of the Moſaical law, written in letters of gold, and ſix elders of each tribe, in all ſeventy-two, who were received with marks of reſpect by the king, and then conducted into the iſle of Pharos, where they were lodged in a houſe prepared for their reception, and ſupplied with every thing neceſſary in abundance. They ſet about the tranſlation without loſs of time, and finiſhed it in ſeventy-two days; and the whole being read in the preſence of the king, he admired the profound wiſdom of the law of Moſes; and ſent back the deputies, laden with preſents for themſelves, the high-prieſt, and the temple.

This verſion was in uſe to the time of our bleſſed Saviour, and is that out of which all the citations in the New Teſtament, from the Old, are taken. It was alſo the ordinary and canonical tranſlation made uſe of by the Chriſtian church in the earlieſt ages; and it ſtill ſubſiſts in the churches both of the eaſt and weſt. It is, however, obſervable, that the chronology of the Septuagint is different from the Hebrew text. See the article EPOCHA.

SEPTUM, in anatomy, an incloſure, or partition; a term applied to ſeveral parts of the body, which ſerve to ſeparate one part from another.

SEPULCHRAL, ſomething belonging to ſepulchres, or tombs.

SEPULCHRE, a tomb, or place deſtined for the interment of the dead. This term is chiefly uſed in ſpeaking of the burying places of the ancients, thoſe of the moderns being uſually called tombs.

SEQUEL, in logic, the ſame with concluſion. See the article CONCLUSION.

SEQUESTRATION, in common law, is ſetting aſide the thing in controverſy from the poſſeſſion of both the parties that contend for it. In which ſenſe it is either voluntary, as when done by the conſent of the parties; or neceſſary, as where it is done by the judge, of his own authority, whether the parties will or not.

SEQUIN, a gold-coin, ſtruck at Venice, and in ſeveral parts of the grand ſeignor's dominions. See the article COIN.

SERAGLIO, a Perſian word, which ſignifies the palace of a prince or lord, in which ſenſe the houſes of the ambaſſadors of England, France, &c. are, at Conſtantinople, called their ſeraglios. But the term ſeraglio is uſed, by way of eminence, for the palace of the grand ſeignor at Conſtantinople, where he keeps his court, in which his concubines are lodged, and where the youth are trained up for the principal poſts of the empire.

SERAPH, or SERAPHIM, a ſpirit of the higheſt rank in the hierarchy of angels; who are thus called, from their being ſuppoſed to be moſt inflamed with divine love, by their nearer and more immediate attendance at the throne of God, and to communicate their fervor to the remoter and inferior orders. See ANGEL.

SERAPHIC, burning or inflamed with love or zeal, like a ſeraphim: thus St. Bonaventure is called the ſeraphic doctor, from his abundant zeal and fervor.

SERAPIAS, baſtard-hellebore, in botany, a genus of plants, whoſe corolla conſiſts of five ovato-oblong petals, which are ſpreading, but cloſe at the top; the nectarium is the length of the petals, hallowed at the baſe, cut into three points, the middle being cordated and obtuſe, and the others acute; the filaments are two, and ſhort, placed on the piſtillum, and topped with erect antheræ: the fruit is an oval, obtuſe, three-cornered capſule, having one cell, and containing a great number of ſcabiform ſeeds. This genus comprehends the helleborine of Tournefort.

SERENA, the ſame with coquimbo. See the article COQUIMBO.

Gutta SERENA, in medicine. See the article GUTTA SERENA.

SERENADE, a kind of concert given in the night, by a lover to his miſtreſs, under her window.

SERENE, a title of honour given to ſeveral princes,

princes, and to the principal magiſtrates of a republic.

SERGE, in commerce, a woollen ſtuff manufactured in a loom, of which there are various kinds, denominated either from their different qualities, or from the places where they are wrought; the moſt conſiderable of which is the London-ſerge, which is highly valued abroad, and of which a manufacture has been for ſome years carried on in France.

SERGEANT, or SERJEANT *at Law*, or *of the Coif*, is the higheſt degree taken at the common law, as that of doctor is of the civil law; and as theſe are ſuppoſed to be moſt learned and experienced in the practice of the courts, there is one court appointed for them to plead in by themſelves, which is the Common-Pleas, where the common law of England is moſt ſtrictly obſerved: but they are not reſtrained from pleading in any other court, where the judges, who cannot have that honour till they have taken the degree of ſerjeant at law, call them brothers.

Theſe ſerjeants are created by the king's writ, commanding them to take upon them that degree therein aſſigned, under a great penalty: and one or more of theſe is ſtiled the king's ſerjeant, who is choſen out of the reſt to plead for him in all cauſes, more eſpecially thoſe of treaſon, &c.

SERJEANT *at Arms*, or *Mace*, an officer appointed to attend the perſon of the king, to arreſt traitors, and ſuch perſons of quality as offend; and to attend the lord high ſteward when ſitting in judgment on a traitor.

The number of theſe officers is by ſtatute limited to that of thirty: there are now eight at court, who are created with great ceremony; for the perſon kneeling before the king, his majeſty lays the mace on his right ſhoulder, and ſays, "Riſe up, ſerjeant of arms, and eſquire, for ever." They attend in the preſence-chamber, where the band of gentlemen-penſioners wait; and receiving the king at the door, they carry the maces before him, when he goes to chapel, or the houſe of lords.

There are four other ſerjeants at arms created in the ſame manner; one of whom attends the lord chancellor; a ſecond, the lord treaſurer; a third, the ſpeaker of the houſe of commons; and a fourth, the lord-mayor of London, on ſolemn occaſions. There is alſo an inferior kind of ſerjeants at mace, who attend the mayor, or the head officer of corporations.

SERGEANT, or SERJEANT, in war, is an inferior officer in a company of foot, or troop of dragoons, armed with an halbard, and appointed to ſee diſcipline obſerved, to teach the ſoldiers the exerciſe of their arms, and to order, ſtraiten, and form ranks, files, &c.

SERGEANTY, or SERJEANTY, in law, is taken for a ſervice that cannot be due from a tenant to any other lord beſides the king.

SERIES, in general, denotes a continued ſucceſſion of things in the ſame order, and having the ſame relation or connection with each other: in this ſenſe we ſay, a ſeries of emperors, kings, biſhops, &c.

In natural hiſtory, a ſeries is uſed for an order or ſubdiviſion of ſome claſs of natural bodies; comprehending all ſuch as are diſtinguiſhed from the other bodies of that claſs, by certain characters, which they poſſeſs in common, and which the reſt of the bodies of that claſs have not.

SERIES, in mathematics, is a number of terms, whether of numbers or quantities, increaſing or decreaſing in a given proportion; the doctrine of which has already been given under the article PROGRESSION.

Infinite SERIES, is a ſeries conſiſting of an infinite number of terms, that is, to the end of which it is impoſſible ever to come; ſo that the ſeries being carried on to any aſſignable length, or number of terms, it can be carried yet farther, without end or limitation.

A number actually infinite (that is, all whoſe units can be actually aſſigned, and yet is without limits) is a plain contradiction to our ideas about numbers; for whatever number we can conceive, or have any proper idea of, is always determinate and finite; ſo that a greater after it may be aſſigned, and a greater after this; and ſo on, without a poſſibility of ever coming to an end of the addition or encreaſe of numbers aſſignable; which inexhauſtibility, or endleſs progreſſion in the nature of numbers, is all we can diſtinctly underſtand by the infinity of number; and therefore to ſay that the number of any thing is infinite, is not ſaying, that we comprehend their number, but indeed the contrary; the only thing poſitive in this propoſition being this, that the number of theſe things is greater than any other number which we can actually conceive and aſſign. But then, whether in things that do really exiſt, it can be truly ſaid, that their number is greater than any aſſignable number; or, which is the ſame thing, that in the numeration of their units one after another, it is impoſſible ever to come to an end; this is a queſtion about which there are different opinions, with which we have no buſineſs in this place; for all that we are concerned here to know, is this certain truth, that after one determinate number, we can conceive a greater, and after this a greater, and ſo on without end. And therefore, whether the number of any things that do or can really exiſt all at once, can be ſuch that it exceeds any determinable number, or not, this is true, that of things which exiſt, or are produced ſucceſſively one after another, the number may be greater than any aſſignable one; becauſe though the number of things thus produced, that does actually

actually exiſt at any time, is finite, yet it may be increaſed without end. And this is the diſtinct and true notion of the infinity of a ſeries; that is, of the infinity of the number of its terms, as it is expreſſed in the definition.

Hence it is plain, that we cannot apply to an infinite ſeries the common notion of a ſum, viz. a collection of ſeveral particular numbers that are joined and added together one after another, for this ſuppoſes that theſe particulars are all known and determined; whereas the terms of an infinite ſeries cannot be all ſeparately aſſigned, there being no end in the numeration of its parts, and therefore it can have no ſum in ſenſe. But again, if we conſider that the idea of an infinite ſeries conſiſts of two parts, viz. the idea of ſomething poſitive and determined, in ſo far as we conceive the ſeries to be actually carried on; and the idea of an inexhauſtible remainder ſtill behind, or an endleſs addition of terms that can be made to it one after another; which is as different from the idea of a finite ſeries as two things can be: hence we may conceive it as a whole of its own kind, which therefore may be ſaid to have a total value whether that be determinable or not. Now in ſome infinite ſeries this value is finite or limited; that is, a number is aſſignable beyond which the ſum of no aſſignable number of terms of the ſeries can ever reach, nor indeed ever be equal to it, yet it may approach to it in ſuch a manner, as to want leſs than any aſſignable difference; and this we may call the value or ſum of the ſeries; not as being a number found by the common method of addition, but as being ſuch a limitation of the value of the ſeries, taken in all its infinite capacity, that if it were poſſible to add them all one after another, the ſum would be equal to this number.

Again, in other ſeries the value has no limitation; and we may expreſs this, by ſaying, the ſum of the ſeries is infinitely great; which indeed ſignifies no more than that it has no determinate and aſſignable value; and, that the ſeries may be carried ſuch a length as its ſum, ſo far, ſhall be greater than any given number. In ſhort, in the firſt caſe we affirm there is a ſum, yet not a ſum taken in the common ſenſe; in the other caſe we plainly deny a determinate ſum in any ſenſe.

Theorem I. In an infinite ſeries of numbers, increaſing by an equal difference or ratio (that is, an arithmetical or geometrical encreaſing progreſſion) from a given number, a term may be found greater than any aſſignable number.

Hence, if the ſeries encreaſe by differences that continually encreaſe, or by ratios that continually encreaſe, comparing each term to the preceding, it is manifeſt that the ſame thing muſt be true, as if the differences or ratios continued equal.

Theorem II. In a ſeries decreaſing in infinitum in a given ratio, we can find a term leſs that any aſſignable fraction.

Hence, if the terms decreaſe, ſo as the ratios of each term to the preceding do alſo continually decreaſe, then the ſame thing is alſo true, as when they continue equal.

Theor. III. The ſum of an infinite ſeries of numbers all equal, or encreaſing continually, by whatever differences or ratios, is infinitely great; that is, ſuch a ſeries has no determinate ſum, but grows ſo as to exceed any aſſignable number.

Demonſ. 1. If the terms are all equal, as A : A : A, &c. then the ſum of any finite number of them is the product of A by that number, as $A\,n$; but the greater n is, the greater is $A\,n$; and we can take n greater than any aſſignable number; therefore $A\,n$ will be ſtill greater than any aſſignable number.

Secondly, ſuppoſe the ſeries encreaſes continually (whether it do ſo infinitely or limitedly) then its ſum muſt be infinitely great, becauſe it would be ſo if the terms continued all equal, and therefore will be more ſo, ſince they encreaſe. But if we ſuppoſe the ſeries encreaſes infinitely, either by equal ratios or differences, or by encreaſing differences or ratios of each term to the preceding; then the reaſon of the ſums being infinite will appear from the firſt theorem; for in ſuch a ſeries, a term can be found greater than any aſſignable number, and much more therefore the ſum of that and all the preceding.

Theor. IV. The ſum of an infinite ſeries of numbers decreaſing in the ſame ratio, is a finite number, equal to the quote ariſing from the diviſion of the product of the ratio and firſt term, by the ratio leſs by unity; that is, the ſum of no aſſignable number of terms of the ſeries can ever be equal to that quote; and yet no number leſs than it, is equal to the value of the ſeries, or to what we can actually determine in it; ſo that we can carry the ſeries ſo far, that the ſum ſhall want of this quote leſs than any aſſignable difference.

Demonſ. 2. To whatever aſſigned number of terms the ſeries is carried, it is ſo far finite; and if the greateſt term is l, the leaſt A, and the ratio r, then the ſum is $S = \frac{rl - A}{r - 1}$. See *Geometrical* PROGRESSION.

Now, in a decreaſing ſeries from l, the more terms we actually raiſe, the laſt of them, A becomes the leſſer, and the leſſer A be, $rl - A$ is the greater, and ſo alſo is $\frac{rl - A}{r - 1}$; but $rl - A$ being ſtill leſs than rl, therefore $\frac{rl - A}{r - 1}$ is ſtill leſs than $\frac{rl}{r - 1}$, that is, the ſum of any aſſignable number of the terms of the ſeries is ſtill leſs than the quote mentioned, which is $\frac{rl}{r - 1}$, and this is the firſt part of the theorem.

Again, the ſeries may be actually continued ſo far,

far, that $\frac{rl-A}{r-A}$ shall want of $\frac{rl}{r-1}$ less than any assignable difference; for, as the series goes on, A becomes less and less in a certain ratio, and so the series may be actually continued till A becomes less than any assignable number (by Theorem II) now $\frac{rl}{r-1} - \frac{rl-A}{r-1} = \frac{A}{r-1}$, and $\frac{A}{r-1}$ is less than A; therefore, let any number assigned be called N, we can carry the series so far till the last term A be less than N; and because $\frac{rl-A}{r-1}$ wants of $\frac{rl}{r-1}$, the difference $\frac{A}{r-1}$, which is less than A, which is also less than N, therefore the second part of the theorem is also true, and $\frac{rl}{r-1}$ is the true value of the series.

Scholium. The sense in which $\frac{rl}{r-1}$ is called the sum of the series, has been sufficiently explained; to which, however, we shall add this: that whatever consequences follow from the supposition of $\frac{rl}{r-1}$ being the true and adequate value of the series taken in all its infinite capacity, as if the whole were actually determined and added together, can never be the occasion of any assignable error in any operation or demonstration where it is used in that sense; because, if it is said that it exceeds that adequate value, yet it is demonstrated that this excess must be less than any assignable difference, which is in effect no difference, and so the consequent error will be in effect no error: for if any error can happen from $\frac{rl}{r-1}$ being greater than it ought to be, to represent the complete value of the infinite series, that error depends upon the excess of $\frac{rl}{r-1}$ over that complete value; but this excess being unassignable, that consequent error must be so too; because still the less the excess is, the less will the error be that depends upon it. And for this reason, we may justly enough look upon $\frac{rl}{r-1}$ as expressing the adequate value of the infinite series. But we are farther satisfied of the reasonableness of this, by finding in fact, that a finite quantity does actually convert into an infinite series, which happens in the case of infinite decimals. For example, $\frac{2}{3} = .6666$, &c. which is plainly a geometrical series from $\frac{6}{10}$ in the continual ratio of 10 to 1; for it is $\frac{6}{10} + \frac{6}{100} + \frac{6}{1000} + \frac{6}{10000}$, &c. And reversely, if we take this series, and find its sum by the preceding theorem, it comes to the same $\frac{2}{3}$; for $l = \frac{6}{10}$, $r = 10$, therefore $rl = \frac{60}{10} = 6$; and $r - 1 = 9$; whence $\frac{rl}{r-1} = \frac{6}{9} = \frac{2}{3}$.

Theorem V. In the arithmetic progression 1, 2, 3, 4, &c. the sum is to the product of the last term, by the number of terms, that is, to the square of the last term; in a ratio always greater than 1 : 2, but approaching infinitely near it. But if the arithmetical series begins with 0, thus, 0, 1, 2, 3, 4, &c. then the sum is to the product of the last term, by the number of terms, exactly in every step as 1 to 2.

Theorem VI. Take the natural progression, beginning with 0, thus, 0, 1, 2, 3, &c. and take the squares of any the like powers of the former series; as the squares, 0, 1, 4, 9, &c. or cubes, 0, 1, 8, 27; and then again take the sum of the series of powers to any number of terms, and also multiply the last of the terms summed by the number of terms (reckoning always 0 for the first term) the ratio of that sum, to that product is more than $\frac{1}{n \times 1}$ (n being the index of the powers) that is, in the series of squares it is more than $\frac{1}{3}$; in the cubes more than $\frac{1}{4}$; and so on: but the series going on in infinitum, we may take in more and more terms without end into the sum; and the more we take, the ratio of the sum to the product mentioned, grows less and less; yet so as it never can actually be equal to $\frac{1}{n \times 1}$ but approaches infinitely near to it, or within less than an assignable difference.

SERIOLA, in botany, a genus of plants, whose flower is compound, imbricated, and uniform; the florets which compose it are each monopetalous, ligulated, linear, truncated, and quinquedentated; there is no pericarpium, but the seeds, which are oblong and crowned with down, are contained in the cup, and placed on a paleaceous receptacle.

This genus comprehends the achyrophorus of Vaillant.

SEROSITY, in medicine, denotes an overabundance of serum. See the articles SERUM and BLOOD.

SERPENS, in astronomy, a constellation in the northern hemisphere, called more particularly *Serpens Ophiuchi*.

The stars in the constellation Serpens, in Ptolemy's catalogue, are 17; in Tycho's, 19; in the Britannic catalogue, 59. The longitudes, latitudes, magnitudes, &c. are as follow:

Names

Names and Situations of the Stars.	Signs	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ′	
	♏	8.38.45	16. 52	7
		9.42. 7	16.21.30	7
		11.33.31	22.10.	6 7
Inform. preced. the neck and head of the ſerpent		13. 4. 8	17.50.23	6
		13.30	19.27. 6	6
5.				
		14.17. 4	18.32. 6	6
		11. 1. 4	29.59.11	7
		15.26.37	17. 1.48	7
		10.57.20	32.58.55	6
		15.45.18	20. 7. 2	6
10.				
		17.49.57	17.27.54	6
Firſt of the three under the jaw		12.29.35	34. 1.52	7
That in the firſt bend of the neck		15. 35	28.54.23	3
Preced. in the ſecond bend of the neck		18.35.18	18.17.38	6
		12.53.15	35.48.44	6
15.				
		15.36.42	28.31.	7
		14. 57	33.24.38	6 7
Middle under the jaw		13.40. 2	34.23.28	6
Third and ſubſequent		14.57.54	34.36.12	6
Firſt from the root of the neck		16.12.31	31.34. 9	6
20.				
Preced. in □ of the head, or in extremity of the cheek		13.51. 5	38. 8.21	5
		14.23. 7	36.59.54	6
Preced of two before the ſecond bend		19.42.50	21.45. 3	6
The lucid one of the neck		18.43.22	25.31.56	2
Poſterior in the ſecond bend		21.19.46	17.39.25	6
25.				
That following the lucida to north, by Tycho reckoned the ſixteenth Oph.		15.36.34	36. 2.33	6
		19. 4.56	26.34.53	4
South of □ in root of the neck		16.37. 3	34.21.30	3
		22.31.46	15.51.	6
A ſmall one under that		17.21. 6	33. 9.36	6
30.				
Behind the ſecond bend before Oph. hand		22.37. 8	16.16.11	4
Subſeq. before the ſecond bend		21.27. 5	21.47.38	6
In mouth, in middle of □ of head		16.26.47	37. 8.59	4
Subſeq. behind the ſecond bend		22.57.13	16.41.49	6
That following the lucida to the ſouth		20.59.22	24. 2. 5	3
35.				
North againſt the noſtrils in the □ of the head		16.11.21	40. 1.39	4 3
		19.16.18	32.41.18	6
		20.58.18	28.15.34	7
In temples, firſt ſubſeq. of □		19.23. 4	35.19.32	3
That without the head to north		18.48.23	42.28.52	4
40.				
		24.12.27	30.15.16	6
		24.45.58	28.58.33	7
		22.23.30	37.15. 8	4
		23.59.59	37. 3.33	6
That following preced. Oph. hand		29.59.59	22.16. 2	5
45.				
		29.11.31	28. 7.57	6
	♐	12. 7.23	9.44.45	6

Names and Situations of the Stars.	Signs.	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ″	
First of three behind Oph. hind thigh		16.57.39	10.18.11	4
		17.12.46	10. 8.59	6
South of two following this		21.13.23	7.59. 5	4
50.				
North of these		22. 7. 5	10.32.52	5
In last bend behind Oph. hand		26.47.32	19.47.52	3
Last but one of the tail	♑	2.31. 3	20.31.56	3
Of three small ones following that, north		4. 6.51	23.29.53	6
Of three small ones following that, south		4.38.38	21.17.24	6
55.				
Middle and subsequent		5.19.15	22.14. 4	6
		12.31.28	29.19.27	6
In extremity of the tail		12.26.30	26.54.41	3
Small one adjacent to this	♒	12.31.48	25.13.45	6

SERIPHIUM, in botany, a genus of plants, whose flower-cup is double; the corolla is monopetalous and funnel-shaped, with the limb quinquedentated; the stamina are five capillary filaments, topped with cylindraceous antheræ; there is no pericarpium, but the cup, which is immutable, contains an oblong solitary seed.

This genus comprehends the helichrysoides of Vaillant.

SERPENT, *Serpens*, in zoology, a general term for all amphibious animals without legs. See the article AMPHIBIOUS.

Mr. Ray defines serpents to be creatures breathing by means of lungs, having only one ventricle in the heart, having no feet, and having a long body covered with scales. To which he adds, that in cold seasons they can bear hunger a long time. The greater part of the serpent class are poisonous, and dangerous in their bite, leaving a mischievous liquor in the wound made by their tooth, which mixing by this means immediately with the blood, is of fatal consequence; though the whole creature may be eaten with safety, or even the poisonous liquor, which does this mischief in the wound, tasted without hurt.

SERPENTARIA, snake-root, in botany and pharmacy, the name of a species of aristolochia, or birthwort, with auriculated leaves. See the article ARISTOLOCHIA.

It obtained the name of snake-root as being accounted a specific against venomous bites; but whatever truth there may be in that, it is undoubtedly an excellent diuretic, diaphoretic, and alexipharmic medicine, and is frequently given in malignant fevers and epidemical diseases. It may be given in substance from ten to thirty grains, in powder and in infusion, to two drams.

SERPENTARIUS, in astronomy, a constellation of the northern hemisphere, called also Ophiuchus, and anciently Æsculapius.

The stars in the constellation Serpentarius, in Ptolemy's catalogue, are 29; in Tycho's, 25; and in the Britannic, 69. The longitudes, latitudes, magnitudes, &c. are as follow:

Names and Situations of the Stars.	Signs.	Longitude.	Latitude		Magn.
		° ′ ″	° ′ ″		
North in the preceding hand	♏	28.58.15	17.17.15	N	3
South and subsequent	♐	0.10.45	16.28.20	N	34
North in the preceding knee		1.58.20	13. 18	N	5
South in the preceding leg		4.14.18	1.36. 9	N	5
Under the foal of the preceding foot		5. 7.58	1.42.35	S	6
5.					
Middle in the preceding leg	♏	29.53. 5	26.22.14	N	6
North of these	♐	4.40.25	3.16.32	N	4
In preceding heel		5.21.26	5.14.41	N	4
In the cubitus of preceding arm		6.19.53	28.40	N	5
10.		2.15.38	23.35.38	N	4
		2. 3.21	27. 8.34	N	6
		53.43	33. 52	N	5
		4.23.19	19.34.17	N	6

Names and Situations of the Stars.	Signs.	Longitude.	Latitude.		Magn.
		° ′ ″	° ′ ″		
South in preceding knee		5.53.55	11.25.27	N	3
Informis between the legs		7.58.10	4.28.25	N	5 6
15.					
		4.30.28	26.10.57	N	5 6
		5.17.45	23.12.34	N	6
		6.20. 3	23.11.30	N	6
		4.12.41	30.31.18	N	6
		6.38.12	24.17. 4	N	6
20.					
		6.18.15	27 27.47	N	5 6
		9. 3. 5	11.38.	N	5 6
		6.41.28	29.30.33	N	5
		7.54.17	23.35.16	N	6
		9.42.16	16.22. 1	N	6
25.					
Preceding of two in fore ſhoulder		7.17.51	32.32.16	N	4
Subſequent		8.30.12	31.52.20	N	4
		11. 9.14	18.28.18	N	6
		9.12.22	36.42.	N	6
		9.38. 8	36.15.20	N	6
30.					
		9.42.45	36.13.35	N	6
Againſt the hind knee		14.39.28	7.14.12	N	3
		16.28.32	3.56.17	S	6
In the toes of the hind foot		16.43.28	3.24.16	S	6 5
		16.55.15	3.20.	S	6 7
35.					
		17.12.46	3.29.39	S	6 7
In the back of the hind foot		17. 6.17	1. 8.53	S	6
Caput Herculis		12.48.47	37.18.55	N	3
In the tibia of the hind leg		17.34.52	2. 4.47	N	4
		18. 23	1.42.28	S	6 7
40.					
Bright one in the ſoal of the foot		18. 5. 2	1.47.38	S	4 3
		18.34.53	4.54.52	S	4 5
		18.43.57	59.24	S	7
		19.31.16	6.34.12	S	6
Preceding in heel of hind foot		19. 1.32	53.48	S	4 5
45.					
In the middle of the back	♐	17.15.52	27.20.39	N	5
		20. 57	31.20	S	7
Poſterior in the heel		20. 9.46	38.18	S	6
		18.53.59	36.28.22	N	7
Preceding of two following the foot		21.46.26	1.28.55	N	6
50.					
In Ophiuchus's head		19. 5.32	35.53.16	N	2
		19. 6.51	36.27.27	N	7
In the cubitus of hind arm		21. 2.33	15.15.23	N	4
Laſt of thoſe that follow the foot		22.48.44	1.44 45	N	5
North of two in poſterior ſhoulder		22. 44	27.58.	N	3
55.					
		22.22.46	26. 1.24	N	7
South in the hind ſhoulder		23.18.32	26. 9.20	N	3
		25.31.30	1.24. 8	S	5
South in the hind hand		26.25.16	13.42.45	N	5
		26.46. 1	5.28.51	N	7
60.					

Names and Situations of the Stars.	Signs.	Longitude.	Latitude.		Magn.
		° ′ ″	° ′ ″		
Of three informes behind the poſterior ſhoulder { north —		26.44.33	27.51. 3	N	4 5
middle		26.51.19	26.24.31	N	4
ſouth —		27. 9.17	24.47. 7	N	4
North in the poſterior hand — — —		27.27.33	15.18. 6	N	5
That following middle informis — — —		28. 9.16	26. 3.54	N	4
65.					
North of thoſe following the head — —		28.47.41	32.11.53	N	6
South and bright of thoſe — — —		28.49.43	33. 1.25	N	4
		29.21.39	27.26.14	N	6
After four informes following the ſhoulder { preceding					
ſubſequent	♑	2.29.49	26.44.36	N	6

SERPENTINE, in general, denotes any thing that reſembles a ſerpent: hence, the worm or pipe of a ſtill, twiſted in a ſpiral manner, is termed a ſerpentine worm.

SERPENTINE MARBLE, *Ophites*, a ſpecies of marble, ſo called from its being variegated with ſtreaks and ſpots like the ſkin of a ſerpent. See the article MARBLE.

SERPENTINE VERSES, ſuch as begin and end with the ſame words.

SERPIGO, in medicine, a ſpecies of herpes. See HERPES.

SERPYLLUM, mother of thyme, in botany, a ſpecies of thyme. See THYME.

SERRATED, in general, ſomething indented or notched, in the manner of a ſaw; a term much uſed by botaniſts in the deſcription of the leaves of plants: they are ſaid to be ſimply ſerrated, when the margin is equally cut into ſharp imbricated angles, that point towards the extremity of the leaf, as thoſe of the roſe-tree; and duplicately ſerrated, when the edges of the large ſerratures are again ſerrated with leſſer indentings of the ſame kind; ſuch are the leaves of the common elm-tree.

SERRATULA, ſaw-wort, in botany, a genus of plants, whoſe flower is compound, tubulous, and uniform; the partial ones are monopetalous, hermaphrodite, funnel-ſhaped, and quinquifid at the limb: there is no pericarpium, but the ſeeds, which are ſolitary, oval, and crowned with a long ſeſſile down, are contained in the cup, having a piloſe plane receptacle.

The common ſaw-wort, which grows in many parts of England, is accounted a vulnerary plant, and is ſaid to be good to diſſolve coagulated blood; but at preſent it is not much in uſe.

SERRATUS, in anatomy, a name given to ſeveral muſcles from their reſemblance to a ſaw.

SERVANT, a term of relation, ſignifying a perſon who owes and pays a limited obedience for a certain time, to another in quality of maſter.

If any ſervant, who is hired for a year, depart before the end of his term, without reaſonable cauſe, to be allowed by a juſtice of the peace; or, after the term is expired, without giving a quarter's warning, he is liable to be committed to priſon by two juſtices, till he gives ſecurity to ſerve out the time: or he may, by one juſtice, be ſent to the houſe of correction, there to be puniſhed as a diſorderly perſon, 7 Jac. I. c. 4.

On the other hand, a maſter cannot put away his ſervant before the end of the term he was hired for, without ſome reaſonable cauſe allowed by a juſtice of the peace; nor after the expiration of the term, without a quarter's warning given, on pain of forfeiting 40*s*.

Where a ſervant that is hired for a year happens to fall ſick, ſuch ſervant ought not to be diſcharged, nor his wages abated on that account.

SERVETISTS, a name given to the modern Antitrinitarians, from their being ſuppoſed to be the followers of Michael Servetus, who, in the year 1559, was burnt at Genoa, together with his books.

SERVICE, in law, is a duty which a tenant, on account of his fee, owes to his lord.

SERVICE-TREE, *Sorbus*, in botany. See the article SORBUS.

SERVITES, a religious order in the church of Rome, founded about the year 1233, by ſeven Florentine merchants, who, with the approbation of the biſhop of Florence, renounced the world, and lived together in a religious community on mount Senar, two leagues from that city.

SERVITOR, in the univerſity of Oxford, a ſtudent who attends on another for his maintenance and learning.

SERUM, a thin, tranſparent, ſaltiſh liquor, which makes a conſiderable part in the maſs of blood. See the article BLOOD.

SESAMOIDA OSSA, in anatomy, ſeveral ſmall bones that ſomewhat reſemble the ſeed of the ſeſamum, whence their name.

SESAMUM, oily-grain-plant, in botany, a genus, whoſe flower is monopetalous, campanulated, and ringent; the faux is inflated, patent, and very large, and the limb is cut into five parts, four of which are almoſt equal, and the fifth is twice their length, ovate and upright: the ſtamina are four, two of which are ſhorter than the others; and the

the fruit is an oblong, compreſſed, acuminated capſule, ſlightly four-cornered, having four cells, which contain many almoſt oval ſeeds.

The flowers of this genus reſemble thoſe of the foxglove, but the fruit is different. The ſeeds of a ſpecies of this plant, which grows naturally in India, and cultivated in Carolina, yield, upon expreſſion, a larger quantity of oil than almoſt any other known vegetable. The ſeeds of this plant are alſo uſed by the negroes for food, which they parch over the fire, and mix them with water, and by ſtewing other ingredients with them, make a hearty food. Sometimes a kind of pudding, called benny, or bonny, is made of theſe ſeeds, in the ſame manner as with rice, and is by ſome much eſteemed, but is never uſed for theſe purpoſes in England.

SESELI, Dutch ſarifage, in botany, a genus of umbelliferous plants, whoſe general corolla is uniform; the ſingle flowers conſiſt each of five inflexed heart-ſhaped petals, which are ſlightly unequal, and contain five ſubulated ſtamina: the fruit is ſmall, ovate, channeled, and ſeparable into two parts, each part containing an oval ſeed, plane on one ſide and ſtriated on the other.

SESQUI, a Latin particle, ſignifying a whole and a half, which joined with *altera*, *terza*, *quarta*, &c. is much uſed in the Italian muſic, to expreſs a kind of ratios, particularly ſeveral ſpecies of triples. See the article TRIPLE.

SESQUI-ALTERAL *Proportion*, in geometry and arithmetic, is when any number or quantity contains another once and a half; and the number ſo contained in the greater, is ſaid to be to it in ſubſeſqui-alteral proportion. See the article PROPORTION.

SESQUI-DUPLICATE *Proportion*, is when of two terms the greater contains the leſs twice, with half another over.

SESQUI-QUADRATE, an aſpect or poſition of the planets, when they are at the diſtance of four ſigns and a half, or 135 degrees from each other; and ſeſqui-quintile is an aſpect of the planets when they are 180 degrees from each other.

SESQUI-TERTIONAL *Proportion*, is when any number or quantity contains another once and one-third.

SESSILE ROOTS, among botaniſts, ſuch tuberous roots as adhere to the baſe of the ſtalk. And a ſeſſile leaf expreſſes a leaf immediately fixed to the ſtalk or root, without any petiole.

SESSION, *Seſſio*, in general, denotes each ſitting or aſſembly of a council, &c.

SESSION *of Parliament*, is the ſeaſon or ſpace from its meeting to its prorogation. See the article PARLIAMENT.

SESSION, in law, denotes a ſitting of juſtices in court upon their commiſſion; as the ſeſſions of oyer and terminer, the quarter-ſeſſions, otherwiſe called the general or open ſeſſions of the peace, in oppoſition to what is called a privy-ſeſſion, held upon ſpecial occaſions for ſpeedier diſpatch of juſtice.

SESTERCE, *Seſtertius*, a ſilver coin in uſe among the Romans.

Some authors make two kinds of ſeſterces, the leſs, called ſeſtertius, in the maſculine gender, and the great one, called ſeſtertium, in the neuter, the latter containing a thouſand of the other.

Others will have any ſuch diſtinction of great and little ſeſterces unknown to the Romans; ſeſtertius, ſay they, was an adjective, and ſignified *as ſeſtertius*, or two aſes and a half, and when uſed plurally, as in quinquaginta ſeſtertium, or ſeſtertia, it was only by way of abbreviation, and there was always underſtood millia, or thouſands.

Seſterce, or ſeſtertius, was alſo uſed by the ancients, for a thing containing two wholes and a half of another, as *as* was taken for any whole or integer. See the article INTEGER.

SESUVIUM, in botany, a genus of plants, whoſe flower hath no corolla; the cup is formed of one campanulated leaf, divided into five ovate acute ſegments, which are coloured; below the lacinæ of the cup are inſerted a number of ſubulated filaments, topped with roundiſh antheræ: the fruit is an ovate capſule, with three cells, containing roundiſh ſeeds.

SET, or SETS, a term uſed by farmers and gardeners, to expreſs the young plants of the white-thorn and other ſhrubs, with which they uſe to raiſe their quick or quick-ſet hedges.

SETHIANS, in church hiſtory, Chriſtian heretics, ſo called, becauſe they paid divine worſhip to Seth, whom they looked upon to be Jeſus Chriſt the Son of God, but who was made by a third Divinity, and ſubſtituted in the room of the two families of Abel and Cain, which had been deſtroyed by the deluge.

Theſe heretics appeared in Egypt in the ſecond century, and as they were addicted to all ſorts of debauchery, they did not want for followers, and continued in Egypt above two hundred years.

SETON, in ſurgery, a few horſe-hairs, ſmall threads, or large packthread, drawn through the ſkin, chiefly the neck, by means of a large needle or probe, with a view to reſtore or preſerve health.

We find by experience, that ſetons are very uſeful in the hydrocephalus, catarrhs, inflammations, and other diſorders, particularly thoſe of the eyes, as a gutta ſerena, cataract, and incipient ſuffuſion; to thoſe we may add intenſe head-achs, with ſtupidity, drowſineſs, epilepſies, and even an apoplexy itſelf.

SETTER, among farmers. To ſetter is to cut the dewlap of an ox or cow, and into the wound to put the root of the helleboraſter, whereby an iſſue is made for ill humours to vent themſelves.

SETTING, in aſtronomy, the withdrawing of a ſtar or planet, or its ſinking below the horizon.

Aſtronomers and poets make three different kinds of ſetting of the ſtars, viz. the coſmical, acronycal, and helical.

SETTING, in the ſea language. To ſet the land or the ſun, by the compaſs, is to obſerve how the land bears on any point of the compaſs, or on what point of the compaſs the ſun is. Alſo, when two ſhips ſail in ſight of one another, to mark on what point the chaſed bears, is termed ſetting the chaſe by the compaſs.

SETTING, among ſportſmen, a term uſed to expreſs the manner of taking partridges by means of a dog peculiarly trained to that purpoſe.

SEVENTH, *Septima*, in muſic, an interval called by the Greeks heptachordon, whereof there are four kinds; firſt, the defective ſeventh, conſiſting of three tones, and three greater ſemitones; the ſecond, called by Zarlin and the Italians, demi-ditono con diapente, or ſettimo minore, is compoſed diatonically of ſeven degrees and ſix intervals, four whereof are tones, and the reſt greater ſemitones, and chromatically of ten ſemitones, ſix whereof are greater, and four leſs; it takes its form from the ratio quadriparziente quinto, as 9:5. The third, called by the Italians il ditono con diapente, or ſettimo maggiore, is compoſed diatonically of ſeven degrees, like the former, and ſix intervals, five whereof are tones and a major ſemitone, ſo that only a major ſemitone is wanting to make up the octave, and chromatically of twelve ſemitones, ſix greater and ſix leſs. It takes its form from the ratio of 15:8. The fourth is redundant, and compoſed of five tones, a greater ſemitone and a leſs, ſo that it wants only a comma of an octave, that is, ſo much as to make its ſecond ſemitone greater, called pentatonon. Hence many confound it with the octave, maintaining, with good reaſon, that only the three firſt ſeventhes can be of any uſe.

SEVERANCE, in law, the ſingling or ſeparating of two or more joined in one writ.

SEVERANCE *of Corn*, ſignifies the cutting and carrying the ſame off the ground; and ſometimes it is taken for the ſetting out the tithe from the reſt of the corn.

SEWER, in the houſhold, an officer who comes in before the meat of a king or nobleman, to place and range it on the table.

SEWER is alſo a paſſage or gutter made to carry water into the ſea or a river, whereby to preſerve the land, &c. from inundations and other annoyances.

The buſineſs of the commiſſioners of ſewers, or their office in particular, is to repair ſea-banks and walls, ſurvey rivers, public ſtreams, ditches, &c. and to make orders for that purpoſe. See the article COMMISSION.

SEX, *Sexus*, ſomething in the body which diſtinguiſhes male from female.

SEXAGENARY, ſomething relating to the number ſixty: thus ſexagenary or ſexageſimal arithmetic, is a method of computation proceeding by ſixties; ſuch is that uſed in the diviſion of a degree into ſixty minutes, of the minute into ſixty ſeconds, of the ſecond into ſixty thirds, &c.

Alſo ſexagenary tables are tables of proportional parts, ſhewing the product of two ſexagenaries that are to be multiplied, or the quotient of the two that are to be divided.

SEXAGESIMA, the ſecond Sunday before Lent, or the next to Shrove-Sunday; ſo called, as being about the ſixtieth day before Eaſter.

SEXAGESIMALS, or *Sexageſimal Fractions*, fractions whoſe denominators proceed in a ſexagecuple ratio; that is, a prime, or the firſt minute $= \frac{1}{60}$; a ſecond $= \frac{1}{3600}$; a third $= \frac{1}{216000}$.

Anciently there were no other than ſexageſimals uſed in aſtronomy, and they are ſtill retained in many caſes, though decimal arithmetic begins to grow in uſe now in aſtronomical calculations. In theſe fractions which ſome call aſtronomical fractions, the denominator being always ſixty, or a multiple thereof, is uſually omitted, and the numerator only written down, thus, 4°, $59'$, $32''$, $50'''$, $16''''$, is to be read four degrees, fifty-nine minutes, thirty-two ſeconds, fifty thirds, ſixteen fourths, &c.

SEXANGLE, in geometry, a figure having ſix ſides, and conſequently ſix angles.

SEXTANT, in mathematics, denotes the ſixth part of a circle, or an arch comprehending ſixty degrees.

SEXTILE, *Sextilis*, the poſition or aſpect of two planets, when at ſixty degrees diſtance, or at the diſtance of two ſigns from one another. It is marked thus (*). See the article ASPECT.

SEXTON, a church-officer, whoſe buſineſs is to take care of the veſſels, veſtments, &c. belonging to the church, and to attend the miniſter, churchwardens, &c. at church. He is uſually choſen by the parſon only.

SEXTUPLE, *Seſtuplo*, in muſic, denotes a mixed ſort of triple which is beaten in double time. See TRIPLE.

SEXUALISTÆ, among botanical writers, thoſe who have eſtabliſhed the claſſes of plants upon the differences of the ſexes and parts of fructification in plants, according to the modern method, as Linnæus, &c. See BOTANY.

SHACK, in ancient cuſtoms, a liberty of winter paſturage.

In the counties of Norfolk and Suffolk, the lord of the manor has ſhack; that is, a liberty of feeding his ſheep at pleaſure in his tenants lands, during the ſix winter months.

SHAD, *Alauſa*, in ichthyology, a ſpecies of clupea, with the upper jaw bifid at the extremity, and ſpotted with black: it greatly reſembles the common herring,

herring, and is, on that account, ſometimes called the mother of herring: all the fins are whitiſh, except that on the back: the tail is very much forked.

SHADOW, *Umbra*, in optics, a privation or diminution of light, by the interpoſition of an opake body; or, it is a plane where the light is either altogether obſtructed, or greatly weakened, by the interpoſition of ſome opake body between it and the luminary.

A ſhadow of itſelf is inviſible; and, therefore, when we ſay we ſee a ſhadow, we partly mean that we ſee bodies placed in the ſhadow, and illuminated by light reflected from collateral bodies; and, partly, that we ſee the confines of the light. See the article LIGHT.

If the opake body that projects the ſhadow be perpendicular to the horizon, and the place it is projected on be horizontal, the ſhadow is called a right ſhadow; and ſuch are the ſhadows of men, trees, buildings, mountains, &c. But if the opake body be placed parallel to the horizon, the ſhadow is called a verſed ſhadow; as the arms of a man ſtretched out, &c.

The Laws of the Projection of SHADOWS *from opake Bodies.* — 1. Every opake body projects a ſhadow in the ſame direction with its rays; that is, towards the part oppoſite to the light. Hence, as either the luminary or the body changes place, the ſhadow likewiſe changes. 2. Every opake body projects as many ſhadows as there are luminaries to enlighten it. 3. As the light of the luminary is more intenſe, the ſhadow is the deeper: hence, the intenſity of the ſhadow is meaſured by the degrees of light that ſpace is deprived of. 4. If a luminous ſphere be equal to an opake one it illuminates, the ſhadow, which this latter projects, will be a cylinder, and conſequently will be propagated ſtill equal to itſelf, to whatever diſtance the luminary is capable of acting; ſo that if it be cut in any place, the plane of the ſection will be a circle, equal to a great circle of the opake ſphere. 5. If the luminous ſphere be greater than the opake one, the ſhadow will be conical. If, therefore, the ſhadow be cut by a plane, parallel to the baſe, the plane of the ſection will be a circle; and that ſo much the leſs as it is a greater diſtance from the baſe. 6. If the luminous ſphere be leſs than an opake one, the ſhadow will be a truncated cone; and, conſequently, grows ſtill wider and wider; and, therefore, if cut by a plane, parallel to the ſection, that plane will be a circle, ſo much the greater as it is farther from the baſe.

Of SHADOWS *from the Sun.*—The ſun being vaſtly larger than the whole globe of the earth, muſt give all its ſhadows pointed, by reaſon it illumines more than half of them.

In conſequence of this demonſtration, we might conclude, that all the ſun's ſhadows muſt be leſs than the bodies that project them, and diminiſhed more and more as they recede further and further. Now this would be true were there any relation between the body illuminated and the body illuminating; but as all objects on the earth are ſo ſmall in compariſon of that ſtar, the diminution of their ſhadows is imperceptible to the eye, which ſees them always equal, i. e. either broader or narrower than the body that forms them; on this account all the ſhadows cauſed by the ſun are made in parallels.

From the whole it appears, that to find the ſhadow of any body whatever oppoſed to the ſun, a line muſt be drawn from the top of the luminary perpendicular to the place where the foot of the luminary is to be taken: and through this place an occult line is to be drawn through one of the angles of the plan of the object, and another from the ſun to the ſame object; and the interſection of the two lines will ſhew how far the ſhadow is to go; all the other lines muſt be drawn parallel hereto.

The ſhadows of the ſun are equal in objects of the ſame height, though at a diſtance from each other. See plate LXXXI. fig. 8.

Experience teaches, that ſtiles, or elevations of the ſame height, removed to a diſtance from each other, do yet project equal ſhadows at the ſame time: for they are lengthening and ſhortening, in proportion as the ſun comes nearer, or recedes further off; one or other of which he is continually doing.

For this reaſon, when the ſhadow of an object is to be caſt any way, you muſt determine the place of the ſun, and the point underneath, to draw two occult lines from the ſame, for the extremity of the ſhadow; as here the paliſade A gives the extreme of its ſhadow in B: and if from this point B, you draw a point of ſight C, this line B C will be the ſhadow of the paliſade D, as well as that of A, and of all the reſt in the ſame line to the very point of ſight.

In effect, it muſt be held for a certain maxim, that ſhadows always retain the ſame point of ſight as the objects. On the footing of this obſervation, that objects of the ſame height give equal ſhadows: if you would give the ſhadow of the paliſades, E, F, which are of the ſame height as A, D, take in your compaſſes the diſtance A D, and ſet it on the foot of the paliſade E, by which you will have E G; then from G draw a line to the point of ſight C; and thus you are to proceed, let the number of walks be ever ſo great.

Though the ſun is made to appear in this figure, it muſt not be ſuppoſed that he is ſo near the objects; the deſign being only to ſhew, that the rays proceed from him in this manner, when at ſuch a height, though far without the limits of the piece; as fig. 9, which yet has the line for the foot of the object A B; and thoſe of the rays of the ſun C, C, C, becauſe theſe are always required for finding the extremities of the ſhadows.

The

The ſhadow of the object O is found by continuing the line A B, and making it riſe over the ſteps, and againſt the wall, till cut by the ray in the point S, by the rays paſſing over the corner of the object, and from S drawing a line to the point of ſight T.

To find the ſhadow of the object P, it muſt be remembered, that the foot of the light muſt always be ſuppoſed on the plane where the object is placed. Accordingly, the ray C, cutting the little line A B, ſhews how far the ſhadow of the little object P muſt go, to be thence drawn to the point of ſight T. The object V caſts its ſhadow all along, though in its way it deſcends into a ditch.

The ſhadow of the wall R is found by the ſame rule as the reſt; as appears by the lines A B and the ray C.

SHADOWS *by Torch-light.* The ſhadow of an erect pyramid by torch-light falls as it would by the light of the ſun; and in both caſes there is but one line, whereon the vertical point of the pyramid will be found.

SHADOWS *on ſeveral parallel Planes.* The firſt plane here is the floor, whereon the chair A (plate LXXXI. fig. 10.) ſtands; the ſecond plane is the upper part of the table, parallel to the firſt, and may be either above or below it. There might alſo be more of theſe planes, wherein to find the foot of the illuminating body, in order to come at the ſhadow of the object. Suppoſe the foot of the illuminating body to be C, and the upper flame B; from the points C and B draw lines through the upper and under parts of the object D, which will give the ſhadow E upon the table.

To find the ſhadow of the chair A, which is placed on the ground, determine the foot of the luminary on the table in C on the ground: this is eaſy by the following inſtructions. From the point of diſtance, which is here ſuppoſed to be without the limits of the paper, draw a line through the foot of the table F; then from the angle G upon the table let fall a perpendicular, cutting the line F in the point H, and from H draw a parallel to the baſe H I, which is equal to the upper part of the table, and will direct to the thing required. For drawing a line from the point of ſight K, through the foot of the luminary C, to the extremity of the table L; from the ſame point L, let fall a perpendicular to H I, which will give the point M.

Then from M draw a line to the point of ſight K, in which line M K the foot of the luminary will be found.

To determine the preciſe point, let fall a perpendicular from the point C, which, cutting the line M H, will give the point N for the foot of the luminary.

This point N being thus found, there will be no difficulty in finding the ſhadow of the chair A, the method being the ſame as for the other objects taught before, that is, from the foot of the luminary N draw the lines through all the angles of the plane of the chair, and other lines through the upper part of the chair from the luminary B; theſe latter, by interſecting the former, expreſs the bounds of the ſhadow. For the reſt, the figure gives ſufficient directions.

When two luminaries ſhine on the ſame object, two ſhadows muſt be produced; each of the luminaries occaſioning its reſpective ſhadow, and that in proportion to the circumſtances of the luminary.

If ſuch luminaries, when at equal diſtances, be equal, the ſhadows themſelves muſt be equal: but if there be any diſproportion, that is, if one of them be a little bigger than the other, or one of them a little nearer the object than the other, the ſhadows will be unequal.

From what has been obſerved before, may be drawn this concluſion, that the ſame object may project ſhadows of divers forms, though ſtill illumined on the ſame ſide; the ſun giving one form, the torch another, and the day-light no preciſe form at all.

The ſun always makes its ſhadow equal to the object, that is, projects it parallel-wiſe.

It is certainly of conſequence to all painters, engravers, &c. to obſerve theſe rules preciſely, and not to take the rules for candles, lamps, and the like, in lieu thereof, as is too frequently done.

The ſhadow of a torch, or flambeau, is not projected in parallel lines, but in rays proceeding from a center; whence the ſhadow is never equal to the body, but always bigger, and grows more ſo as it recedes farther off. It appears therefore a groſs abuſe to repreſent the ſhadow of a torch like that of the ſun, and the ſhadow of the ſun like that of a candle, when the difference is ſo conſiderable.

There is a third kind of ſhadow, neither produced by the ſun nor a torch; but only a fine ſunny day, which wanting ſtrength to finiſh and define its form, occaſions a dimneſs near the object. Now for this there is no certain rule, but every body conducts it at diſcretion.

All theſe ſhadows, both of the ſun, of the torch, and of the day-light, muſt appear darker than the parts of objects not illuminated; and that part of the ſhadow that is moſt remote from the object muſt be ſtill darker than that nearer it.

SHADOW, in geography. The inhabitants of the terraqueous globe of the earth receive different denominations according to the different ways wherein their ſhadows are projected; as aſcii, amphiſcii, heteroſcii, and periſcii. See the articles, ASCII, &c.

SHADOW, in painting, an imitation of a real ſhadow, effected by gradually heightening and darkening the colours of ſuch figures, as by their diſpoſitions cannot receive any direct rays from the luminary that is ſuppoſed to enlighten the piece.

The management of the ſhadows and lights makes what the painters call claro-obſcuro. See CLARO OBSCURO.

Geneſis of curves by SHADOWS. See the article CURVE.

SHADDOCK, in botany, a ſpecies of citrus. See the article CITRUS.

SHAFT, *of a Column*, in building, is the body thereof between the baſe and capital: ſo called from its ſtraightneſs. See the article COLUMN.

SHAFT, in mining, is the pit or hollow entrance into it. See MINE.

SHAGREEN, or CHAGREEN, in commerce, a kind of grained leather, prepared, as is ſuppoſed, of the ſkin of a ſpecies of ſqualus, or hound-fiſh, called the ſhagree, or ſhagrain; and much uſed in covering caſes, books, &c.

It is imported from Conſtantinople, Tauris, Tripoli, Algiers, and from ſome parts of Poland, where it is prepared in the following manner; The ſkin being ſtretched out, is firſt covered over with muſtard ſeed, which is bruiſed upon it: and being thus expoſed to the weather for ſome days, it is then tanned.

The beſt is of a browniſh colour, as the white ſort is the worſt: it is extremely hard; yet, when ſteeped in water, it becomes ſoft and pliable; and being faſhioned into caſe-covers, it readily takes any colour, as red, green, yellow, black, according to the fancy of the workman.

SHAKLES, in a ſhip, are the rings with which the ports are ſhut faſt, by laſhing the port-bar to them. There are alſo ſhakles put upon bilbow-bolts, for confining the men who have deſerved corporal puniſhment.

SHALLOT, or ESCHALOTTES, in botany, a ſmall ſpecies of onion, much uſed in modern cookery. For its generical characters, ſee ONION.

SHAMADE, or CHAMADE. See the article CHAMADE.

SHAMBLES, among miners, a ſort of niches, or landing places, left at ſuch diſtances in the adits of mines, that the ſhovel-men may conveniently throw up the ore from ſhamble to ſhamble, till it comes to the top of the mine. See DIGGING, MINE, &c.

SHAMMY, or CHAMOIS-LEATHER, a kind of leather, dreſſed either in oil, or tanned; and much eſteemed for its ſoftneſs, pliancy, and being capable of bearing ſoap without hurt.

SHANK, in the manege, that part of a horſe's fore-leg which lies between the knee and the fetlock.

SHANK-PAINTER, in a ſhip, a ſhort chain faſtened under the fore-ſhrouds, by a bolt, to the ſhip's ſide; having at the other end a rope ſpliced to the chain, on which the after part of the anchor reſts when it lies by the ſhip's ſide.

SHANKER, or CHANCRE, in medicine, a malignant ulcer, uſually occaſioned by ſome venereal diſorder. See the articles GONORRHOEA and POX.

Shankers are generally ſituated on thoſe parts which have a fine and tender covering, as the inward duplicature of the prepuce in men, the inſide of the pudenda in women, the nipples of nurſes, and the lips and tongue of proſtitutes: in very bad caſes they will appear on the dorſum penis, as well as on the pubes and inſide of the thighs.

SHARE *of a Plough*, that part which cuts the ground, the extremity forwards being covered with a ſharp-pointed iron, called the point of the ſhare; and the end of the wood behind, the tail of the ſhare. See PLOUGH.

SHARP, in muſic, a kind of artificial note; for the character and uſe of which, ſee the articles CHARACTER, FLAT, SCALE, &c.

SHARP, in the ſea-language, ſignifies to hale taut, or tight.

SHEARING, or SHEERING. See the article SHEERING.

SHEAT *of a Plough*, a part paſſing through the beam, and faſtened to the ſhare. See the articles PLOUGH and SHARE.

SHEATING, in the ſea-language, is the caſing that part of a ſhip, which is to be under water, with fir-board of an inch thick; firſt laying hair and tar, mixed together under the boards, nailing them on, in order to prevent worms from eating the ſhip's bottom.

SHEATS, in a ſhip, are ropes bent to the clews of the ſails; ſerving, in the lower ſails, to haul aft the clews of the ſail; but, in top-ſails, they ſerve to haul home the clew of the ſail cloſe to the yard-arm.

SHEEP, *Ovis*, in zoology, a well known genus of quadrupeds, the horns of which are hollow, bent backward, twiſted, and rugoſe: the fore-teeth are eight, and the hinder ones are narrower than the others; there are no canine, or dog-teeth.

As to the choice of ſheep to breed, the ram ſhould be young, and his ſkin of the ſame colour with his wool, for the lambs will be of the ſame colour with the ſkin. He ſhould have a large long body, a broad forehead, round, and well riſing, large eyes, and ſtrait and ſhort noſtrils. The polled ſheep, that is thoſe which have no horns, are found to be the beſt breeders. The ewe ſhould have a broad back, a large bending neck, ſmall, but ſhort, clean and nimble legs, and a thick deep wool covering her all over. To know whether they be ſound or not, the farmer ſhould examine the wool, that none of it be wanting, and ſee that the gums be red, the teeth white and even, the briſket ſkin red, the wool firm, the breath ſweet, and the feet not hot. Two years old is the beſt time for beginning to breed, and their firſt lambs ſhould not be kept too long to weaken them by ſuckling, but be ſold as

ſoon as conveniently may be. They will breed advantageouſly till they are ſeven years old.

The farmers have a method of knowing the age of a ſheep, as that of a horſe is known by the mouth. When a ſheep is one ſhear, as they expreſs it, it has two broad teeth before; when it is two ſhears, it will have four; when three, ſix; and when four, eight: after this their mouths begin to break. The difference of land makes a very great difference in the ſheep.

The fat paſtures breed ſtrait, tall ſheep, and the barren hills and downs breed ſquare ſhort ones; woods and mountains breed tall and ſlender ſheep; but the beſt of all are thoſe bred upon new-plowed land, and dry grounds. On the contrary, all wet and moiſt lands are bad for ſheep, eſpecially ſuch as are ſubject to be overflowed, and to have ſand and dirt left on them. The ſalt marſhes are, however, an exception to this general rule, for their ſaltneſs makes amends for their moiſture; any thing of ſalt, by reaſon of its drying quality, being of great advantage to ſheep.

Sheep's dung is one of the beſt manures we know, ſucceeding better on cold lands than any other dung whatever; but as it is not ſo eaſily collected as the dung of large animals, it is commonly conveyed to the land it is intended for, by folding the ſheep upon it. See the articles DUNG and FOLDING.

Sheep-ſtealing, or killing them, in order to obtain their fat, &c. is felony without benefit of clergy.

SHEERING, or SHEARING, in the woollen manufacture, is the cutting off, with large ſheers, the too long nap, in order to make the cloth more ſmooth and even. See the article CLOTH.

SHEERING, in the ſea-language; when a ſhip is not ſteered ſteadily, they ſay ſhe ſheers, or goes ſheering; or, when at anchor, ſhe goes and in out, by means of the current of the tide, they alſo ſay ſhe ſheers.

SHEERS, in a ſhip, are two maſts ſet acroſs at the upper end of each other; a contrivance generally uſed for ſetting or taking out the maſts of a ſhip, where there is no hulk to do that office.

SHEKEL, in Jewiſh antiquity, an ancient coin, worth 2 s. $3\frac{1}{4}$ d. ſterling.

SHELF, among miners, the ſame with what they otherwiſe call faſt ground, or faſt country; being that part of the internal ſtructure of the earth, which they find lying even, and in an orderly manner, and, evidently having retained its primitive form and ſituation, unmoved by the waters of the general deluge, while the circumjacent, and upper ſtrata, have plainly been removed and toſſed about.

SHELL, *Conchia*, in natural hiſtory, a hard, and, as it were ſtony covering, with which certain animals are defended, and thence called ſhell-fiſh.

Foſſile-SHELLS, thoſe found buried at great depths in earth, and often immerſed in the hardeſt ſtones. Theſe foſſile ſhells, as well as thoſe found lying on the ſea-ſhore, make an excellent manure, eſpecially for cold clayey lands; upon which it does not produce nearly ſo great an effect for the two firſt years, as it does in the ſucceeding ones; the reaſon of which is, that it is not then ſufficiently mixed, but in ſucceeding time it breaks itſelf into a number of very ſmall particles, and theſe all become intimately blended with the molecules of earth, and produce their effect more properly.

SHELTIE, a ſmall but ſtrong kind of horſe, ſo called from Shetland, or Zetland, where they are produced.

SHEPHERDS-NEEDLE, *Scandix*, in botany. See SCANDIX.

SHEPHERDS-POUCH, *Burſa Paſtoris*, in botany, an annual plant which grows naturally in many parts of England; the ſtalk riſes to about a foot high, the lower leaves are ſometimes whole, but more generally jagged; thoſe that grow on the ſtalks are much leſs broad at their baſe, having even edges, and ending in a point; the flowers terminate the tops of the branches, they are ſmall and cruciform, conſiſting each of four roundiſh petals, which are ſucceeded by a ſmall heart-ſhaped fruit, or, as ſome fancy, like a purſe, and is about a quarter of an inch long.

For its proper generical characters, ſee the article THLASPI, of which it is held a ſpecies. Its juice is very aſtringent and glutinous; it ſtops bleeding at the noſe, is good againſt ſpitting of blood, and in diarrhœas, dyſenteries, and bloody urine. The doſe, in infuſion, is a handful; of the juice, four ounces; and of the powder of the dried leaves, a dram.

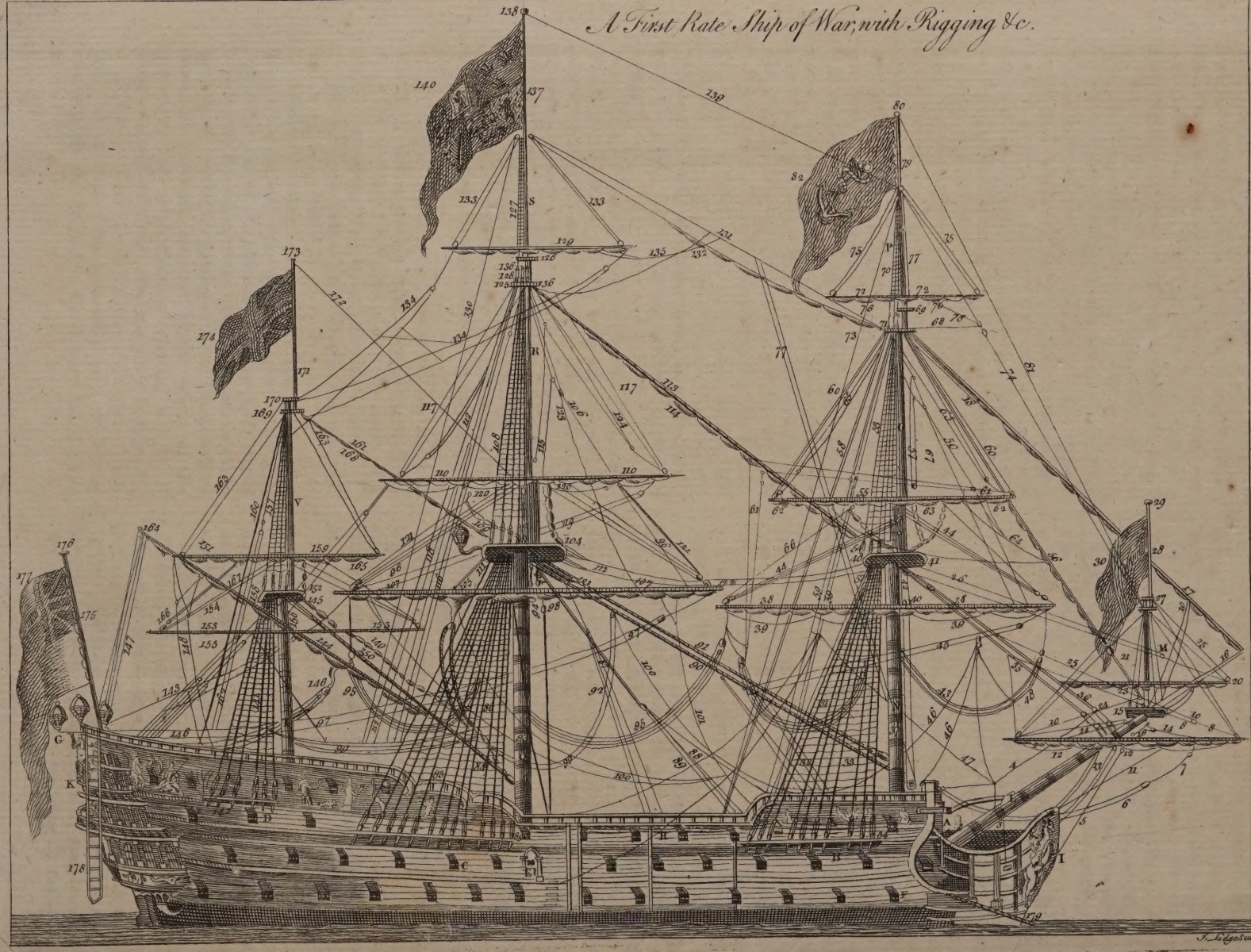
SHEPHERD'S-ROD, *Dipſacus*, in botany. See the article DIPSACUS.

SHERARDIA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is long and cylindraceous, and the limb is divided into four plane acute ſegments; on the top of the tube are placed four filaments, topped with ſingle antheræ: the fruit is oblong, coronated, and ſeparable longitudinally into two oblong ſeeds.

This genus includes the clivers, or gooſegraſs, which grows naturally in hedges: it is reckoned inciding and aperient; and not only promotes urine, but ſweat. Two ounces of the juice have been found to be very ſerviceable in the dropſy, carrying off the water by urine.

SHERIFF, an officer in each county of England, nominated by the king, inveſted with a judicial and miniſterial power, and who takes place of every nobleman in the county, during the time of his office. His judicial authority conſiſts in hearing and determining cauſes in his county-court, and in keeping the peace of the county; he being by the common law

A First Rate Ship of War, with Rigging &c.



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law the principal conſervator of the peace there: for which reaſon he is to aſſiſt the judges, and raiſe the poſſe comitatus when occaſion requires; and ſuch perſons, as on a hue-and-cry he ſhall apprehend upon ſuſpicion of felony, he is to commit to priſon; he may alſo impriſon any one who breaks the peace in his preſence. The miniſterial office of the ſheriff conſiſts in proclaiming ſtatutes, and making returns of writs for electing knights of the ſhire, &c. He collects the king's rents, ſeizes the profits of lands forfeited, and the goods of felons; levies the king's debts, fines, amercements, &c. and is accountable to the king for the profits of the county, on which account the ſum of 4000 l. is ſet apart and annually allowed to the ſheriffs of the ſeveral counties of England, to help them to paſs their account, and to defray their expences at the aſſizes, &c. where no ſheriff is obliged to keep a table for the entertainment of any perſons but thoſe of his own retinue; neither is he to have above forty ſervants in livery, or leſs than twenty attending him. It is alſo his office to execute the writs and proceſſes out of the king's court; and no proceſs is to be ſerved but by the ſheriff. He returns juries for trials, as well in civil as in criminal caſes, except where there is cauſe of challenge againſt him, in which caſe they are to be returned by the coroner. And, laſtly, the ſheriff is to ſee that criminals are executed, and the order of law obſerved in putting them to death. A ſheriff has uſually under him an under-ſheriff, bailiffs, and a gaoler, for all of whom he is anſwerable. An under-ſheriff ought always to have his deputy in the courts of juſtice, in order to receive his commands, and give an account of buſineſs, &c. All returns made by the under-ſheriff are in the name of the high-ſheriff; and for every default in the execution of his office, either by fraud or neglect, the high-ſheriff is amerceable in the exchequer. On the death of any ſheriff, the under-ſheriff ſhall officiate in his name, till another is appointed, and alſo be anſwerable, &c.

SHIELD, an ancient weapon of defence, in the form of a light buckler, borne on the arm, to turn off lances, darts, &c.

SHIELD, in heraldry, the eſcutcheon or field on which the bearings of coats of arms are placed. See ESCUTCHEON.

SHILLING, an Engliſh ſilver coin. See the article COIN.

It is obſerved, that there were no ſhillings or twelve-penny pieces in England till the year 1504, when they were firſt coined by Henry VIII.

SHINGLES, in building, ſmall pieces of wood, or quartered oaken boards, ſawn to a certain ſcantling, or, as is more uſual, cleft to about an inch thick at one end, and made like wedges, four or five inches broad, and eight or nine inches long.

Shingles are alſo uſed inſtead of tiles or ſlates, eſpecially for churches and ſteeples: however, this covering is dear; yet where tiles are very ſcarce, and a light covering is required, it is preferable to thatch; and where they are made of good oak, cleft, and not ſawed, and well ſeaſoned in water and the ſun, they make a ſure, light, and durable covering.

The building is firſt to be covered all over with boards, and the ſhingles nailed upon them.

SHINGLES, in medicine, a kind of herpes. See HERPES.

SHIP, *Navis*, a general name for all large veſſels with ſails, fit for navigation on the ſea; except galleys, which go with oars and ſmack-ſails. See NAVIGATION, NAVAL ARCHITECTURE, and NAVY.

A ſhip is undoubtedly the nobleſt machine that ever was invented; and conſiſts of ſo many parts, that it would require a whole volume to deſcribe it minutely. However, we ſhall endeavour to ſatisfy the reader the more fully on this head, as it is in an article of the utmoſt importance, of which no gentleman ſhould be ignorant: and firſt, to give an idea of the ſeveral parts and members of a ſhip, both external and internal, with their reſpective names in the ſea language, in plate LXXXII. is repreſented a ſhip of war of the firſt rate, with rigging, &c. at anchor; where A is the cat-head; B, the fore-chains; C, the main-chains; D, the mizzen-chains; E, the entring-port; F, the hawſe-holes; G, the poop-lanterns; H, the cheſs-tree; I, the head; K, the ſtern.

L, the bowſprit; 1, 2, yard and ſail; 3, gammoning; 4, horſe; 5, bob-ſtay; 6, ſprit-ſail ſheets; 7, pendants; 8, braces and pendants; 9, halliards; 10, lifts; 11, clew-lines; 12, ſprit ſail horſes; 13, bunt-lines; 14, ſtanding-lifts; 15, ſprit-ſail-top; 16, flying jib-boom; 17, flying jib-ſtay and ſail; 18, halliards; 19, ſheets; 20, horſes.

M, the ſprit-ſail top-maſt; 21, ſhrouds; 22, 23, yard and ſail; 24, ſheet; 25, lifts; 26, braces and pendants; 27, cap; 28, jack-ſtaff; 29, truck; 30, jack-flag.

N, the fore-maſt; 31, runner and tackle; 32, 33, ſhrouds; 34, laniards; 35, ſtay and laniard; 36, preventer-ſtay and laniard; 37, woolding the maſt; 38, yard and ſail; 39, horſes; 40, top; 41, crowfoot; 42, jeers; 43, yard-tackles; 44, lifts; 45, braces and pendants; 46, ſheets; 47, fore-tacks; 48, bow-lines and bridles; 49, fore bunt-lines; 50, fore leech-lines; 51, fore top-rope; 52, puttock-ſhrouds.

O, the fore top-maſt; 53, 54, ſhrouds and laniards; 55, yard and ſail; 56, ſtay and ſail; 57, runner; 58, back-ſtays; 59, halliards; 60, lifts; 61, braces and pendants; 62, horſes; 63, clew-lines; 64, bow-lines and bridles; 65, reef-tackles; 66, ſheets; 67, bunt-lines; 68, croſs-trees; 69, cap.

P, the fore-top gallant-maſt; 70, 71, ſhrouds and laniards; 72, yard and ſail; 73, back-ſtays;

74, ſtay; 75, lifts; 76, clew-lines; 77, braces and pendants; 78, bow-lines and bridles; 79, flag-ſtaff; 80, truck; 81, flag-ſtaff-ſtay; 82, flag of lord high-admiral.

Q, the main-maſt; 83, 84, ſhrouds; 85, laniards; 86, runner and tackle; 87, pendant of the gornet; 88, guy of ditto; 89, ſail of ditto; 90, ſtay; 91, preventer-ſtay; 92, ſtay-tackle; 93, woolding the maſt; 94, jeers; 95, yard-tackles; 96, lifts; 97, braces and pendants; 98, horſes; 99, ſheets; 100, tacks; 101, bow-lines and bridles; 102, crow-foot; 103, top-rope; 104, top; 105, bunt-lines; 106, leech-lines; 107, yard and ſail.

R, the main-top-maſt; 108, 109, ſhrouds and laniards; 110, yard and ſail; 111, puttock-ſhrouds; 112, back-ſtays; 113, ſtay; 114, ſtay-ſail and ſtay and halliards; 115, runnets; 116, halliards; 117, lifts; 118, clew-lines; 119, braces and pendants; 120, horſes; 121, ſheets; 122, bow lines and bridles; 123, bunt-lines; 124, reef-tackles; 125, croſs-trees; 126, cap.

S, the main-top gallant-maſt; 127, 128, ſhrouds and laniards; 129, yard and ſail; 130, back-ſtays; 131, ſtay; 132, ſtay-ſail and halliards; 133, lifts; 134, braces and pandants; 135, bow-lines and bridles; 136, clew-lines; 137, flag-ſtaff; 138, truck; 139, flag-ſtaff-ſtay; 140, flag-ſtandard.

T, the mizzen-maſt; 141, 142, ſhrouds and laniards; 143, pendants and burtons; 144, yard and ſail; 145, crowfoot; 146, ſheet; 147, pendant-lines; 148, peck-brails; 149, ſtay-ſail; 150, ſtay; 151, derric and ſpann; 152, top; 153, croſs jack-yard; 154, croſs jack-lifts; 155, croſs jack-braces; 156, croſs jack-ſlings.

V, the mizzen-top-maſt; 157, 158, ſhrouds and laniards; 159, yard and ſail; 160, back-ſtay; 161, ſtay; 162, halliards; 163, lifts; 164, braces and pendants; 165, bow-lines and bridles; 166, ſheets; 167, clew-lines; 168, ſtay-ſail; 169, croſs-trees; 170, cap; 171, flag-ſtaff; 172, flag-ſtaff-ſtay; 173, truck; 174, flag-union; 175, enſign-ſtaff; 176, truck; 177, enſign; 178, poop-ladder; 179, bower-cable.

Thus we have pointed out the external parts, maſts, rigging, &c. an account of all which may be ſeen under their reſpective articles MAST, HULL, ROPE, RUDDER, &c.

SHIVERS, or SHEEVERS, in the ſea language, names given to the little rollers or round wheels of pulleys. See PULLEY.

SHOAD, among miners, denotes a train of metalline ſtones, ſerving to direct them in the diſcovery of mines. See MINE.

SHOAL, in the ſea language, denotes a place where the water is ſhallow.

SHOAR, or SHORE. See SHORE.

SHOE *for an Anchor*, in a ſhip, the place for the anchor to reſt, and fitted to receive the ſtock, &c. ſo as to prevent the ſheets, tacks, and other running-rigging, from galling, or being entangled with the ſtocks.

SHOOTING. See the articles GUNNERY and PROJECTILE.

SHORE, or SHOAR, a place waſhed by the ſea, or ſome large river.

SHORT-SIGHTEDNESS, *Myopia*, in medicine. See the article MYOPIA.

SHOT, a denomination given to all ſorts of balls for fire-arms; thoſe for cannon being of iron, and thoſe for guns, piſtols, &c. of lead.

Indian SHOT, *Canna*, in botany. See the article CANNA.

SHOVELER, in ornithology, a ſpecies of the anas, with the extremity of the beak broad and round, and its ungues bent. See ANAS.

SHOULDER-BONE, *Humerus*, in anatomy. See the article HUMERUS.

SHOULDER-BLADE, *Scapula*. See the article SCAPULA.

SHOULDER-PITCHED, among farriers, is ſaid of a horſe whoſe ſhoulder is diſplaced, which may be remedied by ſwimming the horſe a dozen times up and down in deep water.

SHOULDER-SPLAIT, is when a horſe's ſhoulder is parted from the breaſt.

SHOULDERING PIECE, among builders, the ſame with a bracket. See the article BRACKET.

SHOWER, in meteorology, a cloud reſolving into rain. See the article RAIN.

SHRIMP, in ichthyology, the Engliſh name of two different ſpecies of the ſquilla, viz. the common ſhrimp, and the ſmooth-noſed ſhrimp.

The common ſhrimp is the long-tailed ſquilla, with the ſnout ſerrated above and tridentated below; the body is oblong and rounded above the beak or ſnout; which diſtinguiſhes it from all the other ſpecies: it is long, of a lanceolated figure, ſharp-pointed, and has eight denticulations above, and three below. The ſmooth-noſed ſhrimp, or long-tailed ſquilla, with a ſmooth ſnout, grows to the ſame ſize with the common ſhrimp; however, the body is thick, and the ſnout is very ſhort, without the ſpines or denticulations of the other.

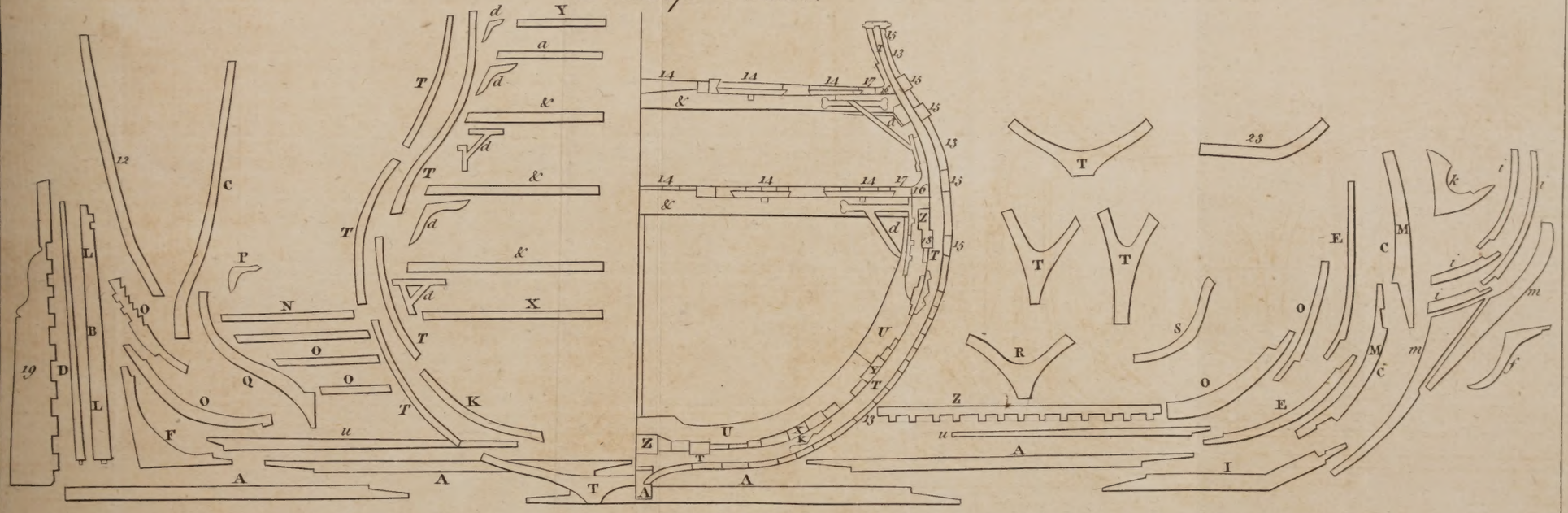
SHRINE, in eccleſiaſtical hiſtory, a caſe or box, to hold the relics of ſome ſaint. See the articles RELICS and SAINT.

SHRITE, in ornithology, the ſame with the miſſel-bird.

SHROVE-TUESDAY, is the Tueſday after quinquageſima Sunday, or the day immediately preceding the firſt of lent; being ſo called from the Saxon word ſhrive, which ſignifies *to confeſs*, as having been employed by the people, in time of popery, in confeſſing their ſins, in order to receive the ſacrament, and thereby qualify themſelves for a more religious obſervation of Lent. See the article LENT.

In

Midship Frame.



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In proceſs of time this cuſtom was changed into that of mutual invitations, in order to take leave of fleſh-meat and other dainties; and this made way for ſports and other merriments, which at preſent make up the whole buſineſs of the carnival, or ſeaſon immediately preceding Lent. See the article CARNIVAL.

SHROWDING *of Trees*, the cutting or lopping off their top branches, which is practiſed only on trees not fit for timber, and deſigned to yield a preſent advantage, and ſerve for fuel.

Trees ſhould be three or four years old before they are ſhrouded, which ſhould be done in winter for the harder ſorts of wood, and in ſpring for the ſofter kinds, taking care to cut the remaining ſtump aſlope and ſmooth.

SHROWDS, or SHROUDS, in a ſhip, are the great ropes which come down both ſides of the maſts, and are faſtened below to the chains on the ſhip's ſide, and aloft to the top of the maſt; being parcelled and ſerved, in order to prevent the maſt's galling them. The top-maſt-ſhrouds are faſtened to the puttock-plates, by dead-eyes and laniards, as the others are. See the article SHIP.

SHRUB, *Frutex*, among botaniſts, a dwarf plant of a woody contexture, being between a tree and an herb; ſuch are the box, roſe, privet, lauruſtinus, ſyringa, &c. It is difficult to determine the difference or boundary between trees and ſhrubs, to ſay where one ends and the other begins; the beſt definition which can be made of a ſhrub, to diſtinguiſh it from a tree, is its ſending forth many ſtems from the roots; whereas trees have a ſingle trunk or body.

SHUTTLE, in the manufactures, an inſtrument much uſed by weavers, in the middle of which is an eye, or cavity, wherein is incloſed the ſpoul with the woof.

SI, in muſic, a ſeventh note or ſound, added by Le Maire to the ſix ancient tones invented by Guido Aretine, viz. *ut*, *re*, *mi*, *fa*, *ſol*, *la*, *ſi*. See the articles GAMUT, SCALE, and SOLFAING.

SIBBALDIA, in botany, a genus of plants, the flower of which conſiſts of five oval petals inſerted into the cup; the ſtamina are five capillary filaments, topped with ſmall obtuſe antheræ; there is no pericarpium, but the cup contains five oblong ſeeds, which cloſes for that purpoſe.

SIBTHORPIA, in botany, a genus of plants, whoſe flower is monopetalous, and divided into five equal patent ſegments; it contains four hairy filaments, topped with oblong, heart-ſhaped antheræ: the fruit is an orbicular, compreſſed, bilocular capſule, containing a few roundiſh oblong ſeeds, which are convex on one ſide, and flat on the other.

SIBYLS, *Sibyllæ*, in Pagan antiquity, certain women ſaid to have been endowed with a prophetic ſpirit, and to have delivered oracles, fore-ſhewing the fates and revolutions of kingdoms, &c.

SICILIAN, in muſic, a kind of air or dance, in triple time, and played ſlow, notwithſtanding it is marked the ſame as a jigg.

SICYOS, in botany, a genus of plants, producing male and female flowers, which are campanulated, and divided into five ſegments; the fruit is an ovate berry, beſet with ſpines, and containing one cell, which incloſes a ſingle ſeed of the ſame ſhape. This genus is the ſame with the ſicyoides of Tournefort, and the bryonoides of Dillenius.

SIDA, Indian mallow, in botany, a genus of plants, whoſe flower is pentapetalous, broad, and emarginated, containing a number of ſtamina, which coaleſce at their bottoms: the fruit is a roundiſh, acuminated capſule, with five cells, each containing a roundiſh ſeed, convex on one ſide, and angular on the other.

This genus comprehends the malvina of Dillenius, and the abutilon of Tournefort.

SIDES-MEN, or SYNOD'S-MEN, perſons who, in large pariſhes, are appointed to aſſiſt the churchwardens, in their enquiry and preſentments of ſuch offenders to the ordinary, as are puniſhable in the ſpiritual court.

SIDERATION, a term uſed for a ſphacelus or mortification. See SPHACELUS.

Some alſo uſe the term ſideration for the blaſting or blighting of trees. See the articles BLIGHT and TREE.

SIDEREAL YEAR. See YEAR.

SIDERITES, in natural hiſtory, the ſame with the magnet. See MAGNET.

SIDERITIS, iron-wort, in botany, a genus of didynamious plants, whoſe flower is monopetalous and ringent; the upper-lip is erect, narrow, and bifid, and the lower one trifid; there is no pericarpium, but the cup contains in its bottom four ſeeds.

Iron-wort is accounted vulnerary and aſtringent, and has been recommended to cure ruptures. The Germans make uſe of it in baths, to open the pores of the ſkin, which it is ſaid to do very powerfully.

SIDEROXYLUM, iron-wood, in botany, a genus of plants, whoſe flower is monopetalous and rotated; the filaments are five, and terminated with oblong incumbent antheræ: the fruit is a roundiſh, unilocular drupe, containing four ſeeds. This genus are natives of the Cape of Good-Hope, and obtained the name of iron-wood among the inhabitants on account of its cloſe contexture, and being ſo heavy as to ſink in water.

SIEGE, in the art of war, the encampment of an army before a fortified place, with a deſign to take it.

SIGESBECKIA, in botany, a genus of plants, whoſe flower is compound and radiated, the diſk is compoſed of a number of hermaphrodite florets, and the rays are formed of a few ligulated female ones: the ſeeds are ſolitary, oblong, and obtuſely trigo-

nal, without any down, and placed on a paleaceous receptacle.

SIGHT, or VISION, in optics. See the articles EYE and VISION.

SIGHTS *of a Quadrant, &c.* thin pieces of braſs, raiſed perpendicularly on its ſide, or on the index of a theodolite, circumferentor, &c. They have each an aperture, or ſlit, up the middle, through which the viſual rays paſs to the eye, and diſtant objects are ſeen.

SIGN, *Signum*, in general, the mark or character of ſomething abſent or inviſible.

SIGN, in aſtronomy, a conſtellation containing a twelfth part of the zodiac, or 30°. See the article ZODIAC.

The names of the ſigns, in the order wherein they follow each other, are, aries, taurus, gemini, cancer, leo, virgo, libra, ſcorpio, ſagittarius, capricornus, aquarius, piſces. See the articles, ARIES, TAURUS, GEMINI, &c.

SIGN-MANUAL, in law, is uſed to ſignify any bill, or writing, ſigned by the king's own hand.

SIGNALS, certain ſigns agreed upon, for ſuddenly conveying intelligence to places, to which the voice cannot reach. Thus, in ſome countries fires are lighted upon the hills, at the approach of danger: and at the beginning of a battle or an attack, ſignals are uſually made with drums and trumpets. At ſea they are given by firing cannon, or muſquets; by lights, flags, ſails, &c.

Signals at ſea are made by the admiral or commander in chief of a ſquadron, either in the day, or by night, whether for ſailing, fighting, or the better ſecurity of the merchant-ſhips under their convoy: theſe are very numerous and important, being all appointed and determined by the lords of the admiralty, and communicated in the inſtructions ſent to the commander of every ſhip of the fleet or ſquadron, before their putting to ſea.

SIGNATURE, a ſigning of a perſon's name at the bottom of an act or deed, wrote by his own hand.

SIGNATURE, in printing, is a letter put at the bottom of the firſt page at leaſt, as a direction to the binder, in folding, gathering, and collating them.

SIGNET, one of the king's ſeals, made uſe of in ſealing his private letters, and all grants that paſs by bill ſigned under his majeſty's hand: it is always in the cuſtody of the ſecretaries of ſtate.

SILENE, in botany, a genus of plants, whoſe flower is pentapetalous; the ungues are narrow, the length of the cup; and the limb is obtuſe and plane; the nectarium is compounded of two ſmall indentures in the neck of each petal, conſtituting a crown to the chaps; the ſtamina are ten ſubulated filaments, topped with oblong antheræ: the fruit is a cloſe cylindrical trilocular capſule, opening at the top five ways, and containing a number of kidney-ſhaped ſeeds. A ſpecies of this genus is cultivated in gardens, and is called by the gardeners, Lobel's catchfly.

SILER, in botany, a ſpecies of laſerpitium. See the article LASERPITIUM.

SILIQUA, a pod, among botaniſts. See the article POD.

SILIQUA is alſo a name by which Tournefort calls the ceratonia of Linnæus. See the article CERATONIA.

SILIQUASTRUM, in botany, Tournefort's name for the cercis of Linnæus. See the article CERCIS.

SILIQUOSE-PLANTS, thoſe which produce pods; ſuch are the cabbage, muſtard, ſtock, &c.

SILK, *Sericum*, in natural hiſtory, is properly an animal fluid, hardened by the air; being an extremely ſoft and gloſſy thread, ſpun by the bombyx or ſilk-worm, the body of which conſiſts of eleven rings: it produces a ſpecies of phalenæ, or moths, with pectinated wings, but no tongue.

The humours, found in the body of this inſect, approach to the nature of ſilk; ſince, on being rubbed in the hand, they leave a ſolid cruſt behind. In the ſides of the belly, all about the ventricle, there are depoſited a vaſt number of veſſels, which contain the ſilky juice; theſe run with various windings and meanders to the mouth, and are ſo diſpoſed, that the creatures can diſcharge their contents at pleaſure at the mouth; and according to the nature of the juices that they are ſupplied with, furniſh different ſorts of ſilk from them; all the fluid contents of theſe veſſels hardening in the air into that ſort of thread, that we find the web, or balls of this creature conſiſt of.

As ſoon as the ſilk-worm is arrived at the ſize and ſtrength neceſſary for beginning his cod, he makes his web; for it is thus they call that ſlight tiſſue, which is the beginning and ground of this admirable work. This is his firſt day's employment. On the ſecond, he forms his folliculus, or ball, and covers himſelf almoſt over with ſilk. The third day he is quite hid, and the following days employs himſelf in thickening and ſtrengthening his ball, always working from one ſingle end, which he never breaks by his own fault, and which is ſo fine, and ſo long, that thoſe who have examined it attentively, think they ſpeak within compaſs when they affirm, that each ball contains ſilk enough to reach the length of ſix Engliſh miles.

In ten days time the ball is in its perfection, and is now to be taken down from the branches of the mulberry-tree, where the worms have hung it. But this point requires a deal of attention; for there are ſome worms more lazy than others, and it is very dangerous waiting till they make themſelves a paſſage, which uſually happens about the fifteenth day.

The firſt, fineſt, and ſtrongeſt balls are kept for the

the grain, the reſt are carefully wound; or if it is deſired to keep them all, or if there be more than can be well wound at once, they lay them for ſome time in an oven moderately hot, or elſe expoſe them, for ſeveral days ſucceſſively, to the greateſt heats of the ſun, in order to kill the inſect, which, without this precaution, would not fail to open itſelf a way to go, and uſe thoſe new wings abroad, it had acquired within.

Ordinarily, they only wind the more perfect balls; thoſe that are double, or too weak, or too coarſe, are laid aſide, not as altogether uſeleſs, but that, being improper for winding, they are reſerved to be drawn out into ſkains.

The balls are of different colours; the moſt common are yellow, orange-colour, Iſabella, and fleſh-colour; there are ſome alſo of a ſea-green, others of a ſulphur-colour, and others white; but there is no neceſſity for ſeparating the colours and ſhades to wind them apart, as all the colours are to be loſt in the future ſcouring and preparing of the ſilk.

In the Philoſophical Tranſactions, N°. 252, we find the following obſervations concerning the goodneſs of ſilk, which is beſt diſtinguiſhed by its lightneſs. The organzine ſilk is the beſt of any made in the country of Piedmont, and two threads are equal in fineneſs, that is in ſmoothneſs, thickneſs, and length, for the thread of the firſt twiſt. For the ſecond, it matters not whether the ſingle thread be ſtrong before the two are joined, unleſs to ſee whether the firſt twiſt prove well.

It is neceſſary that the ſilk be clean; and it is to be obſerved, that the ſtraw-coloured is generally the lighteſt, and the white the heavieſt of all. The ſkains ſhould be even, and all of an equality, which ſhews that they were wrought together; otherwiſe we may with juſtice ſuſpect that it is refuſe ſilk, and cannot be equally drawn out and ſpun, for one thread will be ſhorter than the other, which is labour and loſs.

It will alſo be requiſite to ſearch the bale more than once, and take from out of the parcels a ſkain to make an eſſay; for unleſs it be known by trial what one buys, there is the greateſt danger of being cheated in this commodity. To make an eſtimate, and know the lightneſs, fix the eſſay upon one-eighth of a portée, or hand of ſilk of 110 aunes or ells of Lyons in length, and ſee what it makes of aunes by the eighth part. The ſkain, which is of 80 threads, muſt be multiplied by 110 aunes of Lyons, and from this number muſt be deducted one-eighth; as for example, 110 by 80 makes 8800, the eighth part of which is 1100; and this is the eighth part of a portée, or hand of ſilk. Now, to calculate what theſe 1100 aunes weigh, which is the eighth part of a portée, or of 110 aunes of Lyons, it will be proper to take a ſkain out of the parcels, which you take from out of the bale which you judge may contain, at leaſt, 1100 aunes, to make the one-eighth part of a portée, which portée muſt be divided on two bobbins, half on each; then fix the two bobbins on the center, or beam, and from thence paſs it through the comb hurdiſſoir, viz. 550 from the two bobbins, will make 1100, which will be one-eighth part of what you deſire to know. This done, you cut off your ſilk, and carry it to put on the hurdiſſoir; then weigh it, and multiply the weight by eight, it will weigh juſt as much as a portée of 110 aunes of Lyons, which is the general rule for calculating. When they draw the ſilk out by this means, one may learn to adjuſt the weight.

There are ſilks of Piedmont, which are very light and clean, and are to be prefered before any on the ſale; the portée of ſilk of the lighteſt, weighs near twenty-four penny-weights, and from this it ariſes in gravity to twenty-five, and twenty-ſix penny-weights the portée, and ſometimes to twenty-ſeven and twenty-eight; but even theſe weights may be diſpenſed with, provided that the other qualities be good, that is, that it be well wrought, even, and clean. When the ſilk is more than twenty-eight penny-weights the portée, it muſt always be proportionably cheaper.

Methods of preparing SILKS.—The ſeveral preparations which ſilks undergo to fit them to be uſed in the manufacture of ſilken ſtuffs, are reeling, ſpinning, milling, bleeching, and dyeing.

To wind ſilks from off the balls, two machines are neceſſary; the one a furnace, with its copper; the other a reel, or frame, to draw the ſilk. The winder, then ſeated near the furnace, throws into the copper of water over the furnace (firſt heated and boiled to a certain degree, which cuſtom alone can teach) a handful or two of balls, which have been firſt well purged of all their looſe furry ſubſtance. She then ſtirs the whole very briſkly about with birchen rods, bound and cut like bruſhes; and when the heat and agitation have detached the ends of the ſilks of the pods, which are apt to catch on the rods, ſhe draws them forth, and joining ten or twelve, or even fourteen of them together, ſhe forms them into threads, according to the bigneſs required to the works they are deſtined for: eight ends ſufficing for ribbands; and velvets, &c. requiring no leſs than fourteen. The ends thus joined into two or three threads, are firſt paſſed into the holes of three iron rods, in the fore part of the reel, then upon the bobbins, or pullies, and at laſt are drawn out to the reel itſelf, and there faſtened, each to an end of an arm or branch of the reel. Thus diſpoſed, the winder, giving motion to the reel, by turning the handle, guides the threads; ſubſtitutes new ones, when any of them break, or any of the balls are wound out; ſtrengthens them, where neceſſary, by adding others; and takes away the balls wound out, or that, having been pierced, are full of water. See plate LXXXIII. fig. 1.

In this manner, two perſons will ſpin and reel three pounds of ſilk in a day; which is done with greater diſpatch than is made by the ſpinning-wheel or diſtaff. Indeed, all ſilks cannot be ſpun and reeled after this manner; either by reaſon the balls have been perforated by the ſilk-worms themſelves, or becauſe they are double, or too weak to bear the water; or becauſe they are coarſe, &c. Of all theſe together, they make a particular kind of ſilk, called floretta, which being carded, or even ſpun on the diſtaff, or the wheel, in the condition it comes from the ball, makes a tolerable ſilk.

As to the balls, after opening them with ſciſſars, and taking out the inſects (which are of ſome uſe for the feeding of poultry) they are ſteeped three or four days in troughs, the water whereof is changed every day to prevent their ſtinking. When they are well ſoftened by this ſcouring, and cleared of that gummy matter the worm had lined the inſide withal, and which renders it impenetrable to the water, and even to air itſelf, they boil them half an hour in a ley of aſhes very clear and well ſtrained: and after waſhing them out in the river, and drying them in the ſun, they card and ſpin them on the wheel, &c. and thus make another kind of floretta, ſomewhat inferior to the former.

As to the ſpinning and reeling of raw ſilks off the balls, ſuch as they are brought from Italy and the Levant, the firſt is chiefly performed on the ſpinning-wheel; and the latter, either on hand-reels, or on reels mounted on machines, which ſerve to reel ſeveral ſkains at the ſame time. See the article REEL.

As to the milling, they uſe a mill compoſed of ſeveral pieces, which may mill two or three hundred bobbins at once, and make them into as many ſkains.

Spider-SILK, that prepared of the webs of ſpiders; which, according to Reaumur, is inferior to that obtained from the bags of the ſilk-worm, both in ſtrength and luſtre.

SILLON, in fortification, the ſame with envelope. See the article ENVELOPE.

SILPHIUM, in botany, a genus of plants, whoſe flower is compound and radiated, containing a great number of hermaphrodite funnel-ſhaped florets, which form the diſc, and a few female corollulæ, which are very long, ſpear-ſhaped, and tridentated, which compoſe the rays; the hermaphrodite florets are barren, but the female produce ſolitary, membranaceous, cordated ſeeds, which are placed on a paleaceous receptacle, and contained in the cup.

The ſpecies of this genus are natives of America, and includes the aſteriſcus of Dillenius.

SILVER, *Argentum*, ☽, in natural hiſtory, the pureſt and moſt fixed of all metals, except gold.

Silver, though frequently found native and pure, is however often found in the ſtate of ore; as among the grey ores of copper, the ore of lead, of cobalt, antimony, and other mineral bodies. The proper and peculiar ores of ſilver are of various appearances; as in that of a ſoft ſubſtance of a blackiſh-blue colour, greatly reſembling lead: another ore of ſilver is in form of brown or browniſh-yellow obſcurely tranſparent maſſes, not a little reſembling the coarſer ſorts of amber: there is another ſilver-ore of a very bright and beautiful red, a ſmooth even ſurface, and conſiderably pellucid, reſembling very much native ſandarach. Theſe are the more uſual and determinate ores of ſilver, which in many of the German mines are blended all together, ſometimes with the black kind wholly covering the red: the black kind is often ſoft enough to be cut with a knife.

The method of precipitating ſilver out of an eaſily fuſible ore is this; pound the ore very fine in an iron mortar, and for an aſſay weigh one docimaſtical centner of it, and eight centners of granulated lead; pour into a new teſt about half the lead, ſtir it about with a finger, and ſpread it over the cavity of the teſt; put upon this lead the pounded ore, and then cover it with the remainder of the lead; put the teſt, thus loaded, under the muffle of an aſſay-furnace, and in the hinder part of it make the fire, and encreaſe it to a conſiderable high degree. The ore will ſoon be raiſed out of the melted lead, and ſwim upon it; a little after, it will grow clammy, melt, and be thrown toward the border of the teſt; then the ſurface of the lead will appear clear in the middle of the teſt, and will ſmoak and boil; the fire muſt now be made a little leſs, till the boiling ceaſes, for a quarter of an hour, and then made violent again, and the ſurface of the lead will then diminiſh by degrees, and be covered with a maſs of ſcoriæ. At this time have at hand an iron hook ready heated, and with this ſtir all the matter from the ſides into the middle of the teſt; if the matter, adhering to the hook from the ſtirring, melts quickly again, and the extremity of the hook, when cold, is found covered with a ſhining cruſt, the ſcorification is perfected; but if the ſcoriæ feel clammy while ſtirred, and adhere in quantity to the hook, and are of a rough ſurface, the ſcorification is not perfect, but the matter adhering to the hook muſt be ſtruck off with a hammer, and beat to powder, and returned into the teſt, and the fire continued till the ſcorification is perfected; then take out the teſt, and pour the whole contents into a mould, heated and greaſed. This is the firſt proceſs, and this uſually takes up three quarters of an hour: the ſilver is now in form of a regulus, and muſt be ſeparated by the coppel in the uſual way.

When ſilver-ores are rendered refractory by an admixture of mundic, they muſt be pounded and put into a covered teſt, which is to be placed in an aſſay-furnace under a muffle, till all the mundic is evaporated; which you may know by the ceſſation of the ſmoke from the ore: let this roaſted ore cool leiſurely;

leiſurely; then powder it fine, and mix it with an equal quantity of glaſs of lead reduced likewiſe to fine powder; and, laſtly, ſcorify the whole till the ſilver appear in the form of a bright bead in the middle of the teſt.

When the ſilver is well purified, ſo that all heterogeneous matter, either metallic or other, that might be mixed with it, is extracted, they ſay it is twelve carats fine. This is the expreſſion they uſe to denote the quality of the pureſt ſilver, without any mixture or alloy; but, if there ſhould remain any, they deduct the weight of the mixture from the principal weight, and the remainder ſhews the value of the ſilver. The carat conſiſts of twenty-four grains: ſo that, when to the weight of twelve carats there are twelve grains of mixture, the value of the ſilver is eleven carats twelve grains; and ſo of any other.

Silver, though conſiderably hard in compariſon of lead or gold, is yet malleable and ductile to a very great degree, and may be drawn out into an extremely fine wire. It is leſs capable of ruſt than any other metal, except gold; but it readily becomes black on being rubbed with ſulphur. It requires a middle degree of fire to fuſe it; bearing unaltered a ſtronger degree of heat than either lead or gold, but melting much more eaſily than copper or iron. It, indeed, grows red-hot, but then melts immediately. It amalgamates readily enough with mercury; the readieſt way of mixing them is to to have the ſilver in fine filings, very clear from greaſe, and to rub it in a mortar with the murcury. It is fixed in a common fire, ſo as to loſe ſcarce any thing; and perhaps, truly ſpeaking, not any thing at all, in the fierceſt degree of it, if ever ſo long continued: it has been tried by Boerhaave for two months together, in the eye of a glaſs-houſe furnace, and found to loſe only one twelfth part of its weight in the operation; and it is highly probable, that even this loſs might be owing to the ſilver's not being perfectly purified at firſt.

Silver, expoſed to the fierceſt fire, collected in the focus of a large burning-glaſs, immediately becomes red-hot, melts, and emits a thick ſmoak: ſoon after this, it is covered with a duſty ſubſtance, or calx. If the ſilver have been refined by means of antimony, the calx is of a yellowiſh hue, and, if kept long enough in the focus, it will vitrify in the ſame manner as gold; but, if it have been refined with lead, the calx is whiter, and, Homberg aſſures us, will never vitrify, however long expoſed, even to that degree of heat.

Silver is purified by means of lead, and bears its action without loſs. Fuſed with antimony, if the effect be not carefully prevented, it turns to ſcoria, and becomes volatile: there is no metal, indeed, except gold alone, that bears the teſt with this rapacious mineral, in the common way. See the article GOLD.

The proper ſolvent of ſilver is aqua fortis; it is diſſolved readily by this, and not at all by the common aqua regia; yet, under certain circumſtances, aqua regia will diſſolve ſilver: the firſt phlegm which ariſes in diſtilling that menſtruum, when newly made, and when it has been ſome time in digeſtion with gold, will diſſolve ſilver, and will not touch gold; though it cannot but be acknowledged, this liquor is as much aqua regia, as what follows in the diſtillation. This, however, is an experiment of mere curioſity, not likely ever to occur in the way of buſineſs, and in that reſpect, though we are acquainted with this accident, which was caſually diſcovered by Homberg, we may ſay in general, that aqua fortis diſſolves ſilver, and not gold; and aqua regia gold, and not ſilver. If but the ſmalleſt quantity of ſea-ſalt be put into aqua fortis, it will no longer give a clear ſolution of ſilver. This gives us a teſt for the goodneſs of aqua fortis: and to this difference in the effect of theſe two menſtrua we owe the only method of ſeparating ſilver from gold, without loſs. If ſilver be fuſed with lead, it loſes its ſound, and its bright colour; if melted with tin, it becomes extremely brittle, and the two metals are very difficultly ſeparated again. It melts and mixes eaſily with copper, and by that means acquires a hardneſs which fits it for our coins and utenſils, much better than in its pure natural ſtate.

Refining of SILVER. See the article REFINING.

SILVER-LEAF, that beaten out into fine leaves for the uſe of the gilders, which is performed in the ſame manner as gold-leaf.

SILVER-WIRE, that drawn out into fine wire.

Shell-SILVER, is prepared of the ſhreds of ſilver-leaves, or of the leaves themſelves, for the uſe of painters, after the ſame manner as ſhell-gold.

SILVER-BUSH, *Anthyllis*, in botany, a ſhrub which often grows ten or twelve feet high, and divides into many lateral branches, which are furniſhed with winged leaves, that are very white and hairy; the flowers are produced in ſmall heads at the extremity of the branches; they are of a bright yellow colour, appearing in June; and are ſucceeded by ſhort woolly pods containing two or three kidney-ſhaped ſeeds. This plant is propagated by cuttings, which may be planted any time in the ſummer.

SILVER-TREE, *Protea*, in botany, a genus of plants, whoſe general corolla is uniform and a little longer than the cup, which is imbricated and ſcaly; the proper corolla is monopetalous, with a ſmooth, ſpreading, quadrifid limb, and contains four ſetaceous filaments, terminated with incumbent antheræ; there is no pericarpium, but the ſeeds, which are ſolitary, roundiſh, and naked, are contained in the cup.

The ſpecies of this genus are natives of the Cape of Good Hope, and are noticed for the beauty of their ſhining ſilvery leaves; but, being ſomewhat

tender, they require a green-houſe, to preſerve them in winter.

SILVER-WEED, in botany, a ſpecies of potentilla. See the article POTENTILLA.

SILVERING, the covering any thing with ſilver. It is uſual to ſilver metals, wood, paper, &c. which is performed either with fire, oil, or ſize. Metal-gilders ſilver by the fire: painter-gilders all the other ways. See GILDING.

To ſilver copper or braſs: 1. Cleanſe the metal with aqua-fortis, by waſhing it lightly, and immediately throwing it into fair water; or by heating it red-hot, and ſcouring it with ſalt and tartar, and fair water, with a ſmall wire bruſh. 2. Diſſolve ſome ſilver in aqua-fortis, in a broad-bottomed glaſs veſſel, or of glazed earth, then evaporate away the aqua-fortis over a chaffing-diſh of coals. 3. Put five or ſix times its quantity of water, or as much as will be neceſſary to diſſolve it perfectly, on the remaining dry calx; evaporate this water with the like heat; then put more freſh water, and evaporate again; and if need be, the third time, making the fire towards the latter end ſo ſtrong, as to leave the calx perfectly dry, which, if your ſilver is good, will be of a pure white, 4. Take of this calx, common ſalt, cryſtal of tartar, of each a like quantity, or bulk, and mixing well the whole compoſition, put the metal into fair water, and take of the ſaid powder with your wet fingers, and rub it well on, till you find every little cavity of the metal ſufficiently ſilvered over. 5. If you would have it richly done, you muſt rub on more of the powder, and in the laſt place waſh the ſilvered metal in fair water, and rub it hard with a dry cloth.

SILVERING *of Glaſſes*. See the article FOLIATING *of Looking-Glaſſes*.

SIMATIUM, or SIMAISE, in architecture. See the article CYMATIUM.

SIMILAR BODIES, in natural philoſophy, are ſuch as have their particles of the ſame kind and nature with one another.

SIMILAR FIGURES, in geometry, ſuch as have their angles reſpectively equal, and the ſides, about the equal angles, proportional. See the articles RECTANGLE, TRIANGLE, and POLYGON.

SIMILE, or SIMILITUDE, in rhetoric, a compariſon of two things, which though different in other reſpects, yet agree in ſome one. The difference between a ſimile and compariſon, is ſaid to conſiſt in this, that the ſimile properly belongs to whatever we call the quality of the thing, and the compariſon to the quantity.

SIMILITUDE, in arithmetic, geometry, &c. denotes the relation of two things ſimilar to each other.

SIMONICAL is applied to any perſon guilty of ſimony. See SIMONY.

SIMONIANS, in church hiſtory, a ſect of ancient heretics, ſo called from their founder, Simon Magus, or the magician. The hereſies of Simon Magus were principally his pretending to be the great power of God, and thinking that the gifts of the Holy Ghoſt were venal, and to be purchaſed with money. He is ſaid to have invented the Æons, which were ſo many perſons of whom the Godhead was compoſed. His concubine Helen, he called the firſt intelligence, and mother of all things; and ſometimes he called her Minerva, and himſelf Jupiter. Simon Magus gained a great many proſelytes, who paid himſelf and his concubine divine worſhip; theſe were the earlieſt heretics, and thoſe that St. John, St. Peter and St. Paul, in their epiſtles, ſo often warn the Chriſtians againſt.

SIMONY, in eccleſiaſtical law, the crime of buying or ſelling ſpiritual gifts or preferments.

SIMPLE, *Simplex*, ſomething not mixed or compounded, in which ſenſe it ſtands oppoſed to compound.

SIMPLE, in pharmacy, a general name given to all herbs or plants, as having each its particular virtue, whereby it becomes a ſimple remedy.

SIN, a breach or tranſgreſſion of ſome divine law, or command.

SINAPIS, muſtard, in botany, a genus of plants, whoſe flower is tetrapetalous and cruciform, containing four ovate nectariferous glandules, with ſix erect ſubulated filaments, two of which are the length of the cup, and the others longer; theſe are topped with ſpreading acuminated antheræ: the fruit is an oblong rough pod, having two cells which contain a number of globoſe ſeeds.

The common uſe of muſtard is known to every one, and is very proper for people of a cold conſtitution, becauſe it creates an appetite, helps digeſtion, and attenuates food; the ſeeds are ſtomachic, diaphoretic, antiſcorbutic, and are good in hypochondriac diſeaſes, as well as in ſleepy diſorders: the powder of them taken in white wine is excellent againſt the ſcurvy; and ſome affirm it will cure a quartan ague, if taken in hot wine two hours before the fit. The white muſtard is uſed as a ſallad herb, eſpecially in winter and ſpring.

SINAPISM, in pharmacy, an external medicine in form of a cataplaſm, compoſed chiefly of muſtard-ſeed pulverized, and mixed with the pulp of figs, or with briony, garlic, onion, or the like. See the preceding article.

SINAPISTRUM, in botany, the ſame with the cleome. See CLEOME.

SINCIPUT, in anatomy, the fore-part of the head, reaching from the forehead to the coronal ſuture.

SINDON, in ſurgery, a little round piece of linen ſilk, or lint, uſed in dreſſing a wound after trepanning.

SINE, or *right* SINE *of an Arch*, in trigonometry, is a right line drawn from one end of that arch, perpendicular to the radius drawn to the other end of

of the arch; being always equal to half the chord of twice the arch.

SINE-CURES, eccleſiaſtical benefices without cure of ſouls.

SINEW, denotes what we properly call a nerve, though in common ſpeech, it is rather uſed for a tendon. See the articles NERVE and TENDON.

SINGING, the action of making divers inflexions of the voice, agreeable to the ear, and correſpondent to the notes of a ſong, or piece of melody.

The firſt thing to be done in learning to ſing, is to raiſe a ſcale of notes by tones and ſemi-tones to an octave, and deſcend by the ſame notes; and then to riſe and fall by greater intervals, as a third, fourth, fifth, &c. and to do all this by notes of different pitch. Then theſe notes are repreſented by lines and ſpaces, to which the ſyllables *fa*, *ſo*, *la*, *mi*, are applied, and the pupil taught to name each line and ſpace thereby; whence this practice is called *ſol-faing*.

SINGULAR NUMBER, in grammar, that number of nouns and verbs which ſtands oppoſed to plural; and is uſed when we only ſpeak of a ſingle, or one, perſon, or thing.

SINISTER, ſomething on, or towards, the left hand: ſiniſter is alſo uſed, among us, for unlucky, though in the ſacred rites of divination, the Romans frequently uſed it in an oppoſite ſenſe.

SINISTRI, a ſect of ancient heretics, thus called, becauſe they held the left hand in abhorrence, and made it a point of religion never to receive any thing therewith.

SINKING FUND, a proviſion made by the parliament, conſiſting of the ſurpluſage of other funds, intended to be appropriated to the payment of the national debts; on the credit of which, very large ſums have been borrowed for public uſes.

SINNET, on board a ſhip, a line or ſtring made of rope-yarn, conſiſting generally of two, ſix, or nine ſtrings, which are divided into three parts, and are plaited over one another, and then beaten ſmooth and flat with a wooden mallet.

SINUATED LEAF, in botany, a leaf which has a number of ſinuſes on its ſide, but thoſe ſeparated by lobes, not very long, nor themſelves indented, or notched at the edges.

Sinuato-dentated leaf, expreſſes a leaf like the former, but with the lateral lobes of a linear figure.

SINUS, in anatomy, denotes a cavity in certain bones, and other parts, the entrance whereof is very narrow, and the bottom wider and more ſpacious.

SINUS, in ſurgery, a little cavity, or facculus, frequently formed by a wound or ulcer, where pus is collected.

SIPHON, or SYPHON, in hydraulics, a bended pipe, one end of which being put into a veſſel of liquor, and the other hanging out of the ſaid veſſel over another, the liquor will run out from the firſt into the laſt, after the air has been ſucked out of the external or lower end of the ſiphon, and that as long as the liquor in the upper veſſel is above the upper orifice of the ſiphon.

Thus, HDS (plate LXXXIII. fig. 2.) is a ſiphon, whoſe two parts HD, DS, are called its legs, and by its operation, the water is drawn out of the upper veſſel ABCD, into the lower *a b*. When you have ſucked out the air at S, the water follows, coming in at H, going in the direction HGDS, and out at S, as long as the ſurface EF is above IH; the level of the mouth of what is called the driving leg of the ſiphon, being that in which the water goes up, as that through which it goes down is called the iſſuing leg, and is always longer than the driving leg.

Now, the cauſe of the ſiphon's running is this: The air which preſſes into the veſſel ABCD, repreſented by the column KL, ſuſtains the column of water LD, in the ſhort leg of the ſiphon, preſſing againſt that air with its perpendicular height DF, whilſt the column of air MS, preſſing upwards againſt the hole of the long or iſſuing leg DS (which acts according to the height DC) muſt yield and ſuffer the water to run out as long as the leg DS is longer, or rather higher in perpendicular than DG. For ſince K and M are ſuppoſed at top of the atmoſphere, the column KL and MS are equal in height and preſſure (the height of L above S being of no account in the height of the atmoſphere) as long as MS is acted upon by the deſcending water DS, whoſe height is from D to S (ſuppoſe fifteen inches) an height ſuperior to that of the column DG (ſuppoſe of ſeven inches) ſupported by the column of air KL, the column MS muſt yield to the water iſſuing out at S; and however the ſurface of the water EF deſcends, the column KL, by its preſſure will always overcome the reſiſtance of the column MS, becauſe it has a leſs height of water to ſuſtain than MS has.

If the mouth of the iſſuing leg had been at T, the water would hang in equilibrio, filling both legs of the ſiphon, when the water is come down in the upper veſſel to IHT, becauſe then the two columns of air KL and MS will be acted againſt by an equal height of water in the legs of the ſiphon; but if then you raiſe the iſſuing end of the ſiphon, now ſuppoſed at T, up to the level of *u* V above IH, the water will run back up from V to D, and ſo out at H, in the upper veſſel, becauſe then the column MS having only the height VD to ſuſtain, will be acted againſt with leſs force than the column KL, which is preſſed againſt by the whole height DH, ſuperior to VD. See the articles FLUID, ENGINE, AIR, &c.

Since the preſſure of the air is the cauſe of the water being puſhed up into the ſiphon, and the difference of its preſſure (as one column is acted againſt by the water in the ſhort leg more weakly

than another column of air is acted upon by the water in the long leg) is the cauſe of its running continually from one veſſel into another, when once ſet going, it follows, that the bend D of the upper part of the ſiphon muſt not be above thirty-two feet higher than the water in the upper veſſel, becauſe the air cannot ſuſtain a column of water whoſe height exceeds thirty-two feet.

If, therefore, there was a crane, or ſiphon, ACEDB (fig. 3.) of about forty feet high, reckoning from A to E, with cocks A and B at its lower ends, and a hole at the top E, to be ſtopped with a cork upon occaſion, there might be made the following experiment:

Water being poured into the veſſels A and B, let the cocks A and B be ſhut, then with a funnel, pouring in water at E, till both legs of the ſiphon are full, ſtop the hole E, and open the two cocks at once. The water, inſtead of running from the veſſel A into B, which it would do if the height C A was much under thirty-two feet, will in the two legs fall back to C and D thirty-two feet above A and B, where it will hang, the air not being able to ſuſtain the water above thoſe heights, and conſequently to drive it up over the bend E. Nay, unleſs the water be purged of air before the experiment, the top of the water at C and D will not be quite thirty feet above the water in the veſſels A and B, becauſe air will extricate itſelf out of the water, and getting into the cavity C E D, preſs a little on the top of the water at C and D, ſo that its height will be leſs to balance the preſſure of the atmoſphere.

SIPHONANTHUS, in botany, a genus of plants, the flower of which is monopetalous and funnel-ſhaped; the tube is ſlender and very narrow, and the limb is cut into four ſegments: the fruit conſiſts of four roundiſh berries, within a patulous cup, each containing a roundiſh ſeed.

SIREN, *σειρην*, in antiquity, a kind of fabulous animal, otherwiſe called a mermaid.

SIRIUS, the dog-ſtar, in aſtronomy, a very bright ſtar of the firſt magnitude, in the mouth of the conſtellation canis major. See the articles CANICULA and CANIS.

SIRNAME. See the article SURNAME.

SISARUM, in botany, the ſame with ſium. See the article SIUM.

SISON, corn-parſley, in botany, a genus of umbelliferous plants, the general corolla of which is uniform, each proper one conſiſts of five equal, inflexed, lanceolated petals, with five capillary ſtamina: there is no pericarpium, but the fruit, which is oval and furrowed, divides into two ovate ſeeds, convex and ſtriated on one ſide, and flat on the other.

The ſeeds belonging to a ſpecies of this genus are one of the leſſer hot ſeeds of the ſhops, and have an aromatic ſmell and taſte; they are attenuant, aperient, and carminative: they are preſcribed in flatulencies and cholics, and are ſaid to be a lithontriptic.

SISTRUM, or CISTRUM, a kind of ancient muſical inſtrument, uſed by the prieſts of Iſis and Oſiris.

SISYMBRIUM, water-creſs, in botany, a genus of plants, whoſe flower is tetrapetalous and cruciform; the petals are oblong, and ſpreading with ſmall ungues: the fruit is a long incurved bilocular pod, opening with two valves, and filled with ſmall ſeeds.

This genus includes the radicula of Dillenius. See the article RADICULA.

The common water-creſs grows in marſhes, brooks, rivers, ditches full of water, and other moiſt places in many parts of England.

The young leaves of this plant are frequently eaten in the ſpring as a ſallad, and are prefered by many to all other ſorts of ſallads for their agreeable, warm, bitter taſte: it is aperient, cleanſing, and good againſt the gravel and dropſy; and is recommended as a ſpecific againſt the ſcurvy, for which intention it is eaten in large quantities with great ſucceſs: it is good againſt obſtructions of the viſcera, and conſequently in jaundices, and many of the chronic diſeaſes: it is alſo a powerful diuretic, and promoter of the menſes. The beſt way of uſing it is in manner of a ſallad, or by drinking the expreſſed juice, which is at preſent much a cuſtom with us in ſpring, with that of brook-lime, &c.

SISYRINCHIUM, in botany, a genus of plants, the flower of which conſiſts of ſix oblong patent petals, which have an acute point: the ſtamina are three very ſhort filaments, terminated with bifid antheræ, fixed to the baſe of the ſtyle: the fruit is an oval three-cornered capſule, having three cells, containing a number of roundiſh ſeeds.

SISYRINCHIUM, is alſo the name whereby ſome authors call the plant iris. See the article IRIS.

SITE, or SCITE, *Situs*, denotes the ſituation of a houſe, meſſuage, &c. and ſometimes the ground-plot, or ſpot of earth it ſtands on.

SITUS, in logic, is one of the predicaments declaring a ſubject to be ſo and ſo placed: and in geometry and algebra, it denotes the ſituations of lines, ſurfaces, &c.

SIUM, water-parſnep, in botany, a genus of umbelliferous plants, whoſe general corolla is uniform, each proper one conſiſts of five inflexed heart-ſhaped petals, which are equal, and five ſtamina: the fruit is furrowed, of an oval or roundiſh form, and diviſible into two ſeeds, which are convex and ſtriated on one ſide, and plane on the other.

This genus includes the ſiſarum of Tournefort. See the article SKIRRET.

SIXTH, *Sexta*, in muſic, one of the ſimple original concords, or harmonical intervals.

SIZE, the name of an inſtrument uſed to find the bigneſs of fine round pearls withal.

SIZE,

SIZE, is also a sort of paint, varnish, or glue, used by painters, &c.

The shreds and parings of leather, parchment, or vellum, being boiled in water and strained, make size.

SKAITE, in ichthyology, the variegated raia, with the middle of the back smooth, and one row of spines on the tail.

SKELETON, *σκελετον*, in anatomy, an assemblage or arrangement of all the bones of a dead animal, dried, cleansed, and disposed in their natural situation, and kept in that order by means of wires, &c.

SKIFF, or SQUIFF, the least of two ship-boats, serving chiefly to go ashore in, when the ship is in harbour.

SKIN, *Cutis*, in anatomy. See the articles CUTIS and CUTICULA.

SKIRMISH, in war, a disorderly kind of combat, or encounter, in presence of two armies, between small parties, or persons, who advance from the body for that purpose, and introduce to a general and regular fight.

SKIRRET, *Sisarum*, in botany, is accounted a species of sium. See the article SIUM.

The root of this plant is thought to be very wholesome and nourishing; and the leaves eaten either crude or boiled, are said to break and expel the stone in the kidneys and bladder, and to excite urine.

SKULL, *Cranium & Calvaria*, in anatomy, that part of the head which forms its great bony cavity; and in a living subject contains the brain. See the articles HEAD and BRAIN.

SKY, the blue expanse of air and atmosphere. The azure colour of the sky Sir Isaac Newton attributes to vapours, beginning to condense there, and which have got consistence enough to reflect the most reflexible rays. M. De la Hire attributes it to our viewing a black object, viz. the dark space beyond the regions of the atmosphere, through a white or lucid one, viz. the air illuminated by the sun; a mixture of black and white always appearing blue. See the article COLOUR.

SLAB, an outside sappy plank or board sawed off from the sides of a timber-tree: the word is also used for a flat piece of marble.

SLATE, *Stegania*, in the history of fossils, a stone of a compact texture and laminated structure, splitting into fine plates.

SLAVE, a person in the absolute power of a master, either by war or conquest.

Slavery is absolutely abolished in Britain and France, as to personal servitude. Slaves make a considerable article of the traffic in America.

SLEDGE, a kind of carriage without wheels, for the conveyance of very weighty things, as huge stones, &c.

This is also the name of a large smith's hammer, to be used with both hands. Of this there are two sorts; the uphand-sledge, which is used by underworkmen, when the work is not of the larger sort; it is used with both the hands before, and they seldom raise it higher than their head; but the other, which is called the about-sledge, and which is used for battering or drawing out the largest work, is held by the handle with both hands, and swung round over their heads at their arm's ends, to strike as hard a blow as they can.

SLEEP is defined to be that state wherein the body appearing perfectly at rest, external objects move the organs of sense as usual, without exciting the usual sensations.

With regard to medicine, sleep is defined by Boerhaave, to be that state of the medulla of the brain, wherein the nerves do not receive so copious nor so forcible an influx of spirits upon the brain, as is required to enable the organs of sense and voluntary motion, to perform their functions. Sleep being one of the non-naturals, it is not possible for those to preserve their health, who do not go to sleep in a regular manner; for sleep repairs the spirits, which are dissipated by watching; and consequently it restores the strength of those who are weak, indisposed, or labour much. It likewise promotes perspiration, contributes greatly to digestion, and more to nutrition.

For the sleepy diseases, see the articles CARUS, COMA-VIGIL, COMA-SOMNOLENTUM, LETHARGY, &c.

SLEEPER, or the GREAT SLEEPER, in zoology, the hairy-tailed mus with red feet.

This is the size of the rat, but more corpulent; the head is short and thick; the opening of the mouth small; the nostrils flesh-coloured; the eyes large, black, and prominent; and the ears large and naked. This is frequent in many parts of Europe, and retires in winter into caverns under the ground, where it carries a considerable store of nuts and other fruits.

SLEEPERS, in natural history, a name given to some animals, which are said to sleep all the winter; such as bears, marmotes, dormice, bats, hedgehogs, swallows, &c. We are told, in Med. Essays of Edinb. that these do not feed in winter, have no sensible evacuations, breathe little or none at all, and that most of the viscera cease from their functions. Some of these creatures seem to be dead, and others to return to a state like that of a fœtus before the birth; in this condition they continue, till by length of time maturating the process, or by new heat, the fluids are attenuated, the solids stimulated, and the functions begin where they left off.

SLEEPERS, in the glass-trade, are the large iron-bars crossing the smaller ones, and hindering the passage of the coals, but leaving room for the ashes.

SLEEPERS, in a ſhip, timbers lying before and aft, in the bottom of the ſhip, as the rung-heads do: the lowermoſt of them is bolted to the rung-heads, and the uppermoſt to the futtocks and rungs.

SLIDING, in mechanics, is when the ſame point of a body, moving along a ſurface, deſcribes a line on that ſurface.

SLING, *Funda*, an inſtrument ſerving for caſting ſtones with great violence.

SLINGING is uſed variouſly at ſea, but chiefly for the hoiſting up caſks, or other heavy things, with ſlings, i. e. contrivances of ropes ſpliced into themſelves, at either end, with one eye big enough to receive the caſk, or other thing, to be ſlung.

SLIPS, among gardeners, are ſmall twigs torn off the branches of divers plants, and by which they are propagated more eaſily than by cuttings.

SLITTING-MILL. See SMITHERY, and *Emerſon's* MECHANICS.

SLOANEA, or SLOANA, in botany, a genus of plants, whoſe flower is deſtitute of a corolla; the calyx is monophyllous, and divided into ſeven lanceolated ſegments; the filaments are ſubulated and numerous, with the antheræ joined to their ſides: the fruit is a large roundiſh echnated capſule, having four cells, which contain oval, obtuſe, fleſhy ſeeds, which incloſe each an oblong nucleus.

SLOATS *of a Cart*, the under-pieces which keep the bottom of the cart together. See the article CART.

SLOE-TREE, in botany, a ſpecies of the prunus or plum. See the article PLUM.

SLOOP, a ſort of floating veſſel, otherwiſe called ſhallop. In our navy, ſloops are tenders on the men of war, and are uſually of about ſixty tons, and carry about thirty men.

SLUICE, in hydraulics, a frame of timber, ſtone, earth, &c. ſerving to retain and raiſe the water of the ſea, a river, &c. and on occaſion to let it paſs: ſuch is the ſluice of a mill, which ſtops and collects the water of a rivulet, &c. in order to diſcharge it at length, in greater plenty, upon the mill wheel: ſuch alſo are thoſe uſed in drains, to diſcharge water off lands; and ſuch are the ſluices of Flanders, &c. which ſerve to prevent the waters of the ſea overflowing the lower lands, except when there is occaſion to drown them.

Sometimes there is a canal between two gates or ſluices, in artificial navigation, to ſave the water, and render the paſſage of boats equally eaſy and ſafe, upwards and downwards; as in the ſluices of Briare, in France, which are a kind of maſſive walls, built parallel to each other at the diſtance of twenty or twenty-four feet, cloſed with ſtrong gates at each end, between which is a kind of canal or chamber, conſiderably longer than broad, wherein a veſſel being incloſed, the water is let out at the firſt gate, by which the veſſel is raiſed fifteen or ſixteen feet, and paſſed out of this canal into another much higher. By ſuch means a boat is conveyed out of the Loire into the Seyne, though the ground between them riſe above one hundred and fifty feet higher than either of thoſe rivers.

SMACK, a ſmall veſſel with but one maſt. Sometimes they are employed as tenders on a man of war, and are uſed for fiſhing upon the coaſts, &c.

SMALLAGE, in botany, a ſpecies of apium or parſley. See the article PARSLEY.

Smallage is aperient and diſcuſſive; its root is one of the five great openers, and the ſeeds are reckoned among the four leſſer hot ſeeds; it is very good in groſs conſtitutions and infarctions of the lungs, eſpecially if eat with oil and muſtard. There needs no trouble to reduce it into any medicidal form, ſince it may be eaten as conveniently and agreeably in ſallads.

SMALT, a preparation of arſenic, made as follows: the remaining matter of the cobalt from which the flowers have been ſublimed being ſuffered to cool, and then taken out of the furnace, is reduced to fine powder, and calcined over again in the ſame furnace, and this repeated till there is not the leaſt particle of flame or ſmoke ſeen to ariſe from any part of it. The cobalt thus freed from its arſenical and ſulphureous part, is then ground to an impalpable powder, and a mixture is made of one hundred pounds of this powder, fifty pounds of pure white pot-aſh, and a hundred and fifty pounds of pure white ſand; this is all ground together upon a mill, and then put into a proper furnace, like thoſe of our glaſs-houſes, where it runs into an elegant deep blue glaſs. This is afterwards ground to powder in mills for that purpoſe, and makes what we call ſmalt or powder-blue, uſed by our painters and waſherwomen. It has no uſe in medicine. See the article COBALT.

SMARAGDUS, the EMERALD, in natural hiſtory. See the article EMERALD.

SMECTIS, a name by which ſome call fuller's earth. See the article FULLER.

SMELL, *Odor*, with regard to the organ, is an impreſſion made on the noſe, by little particles continually exhaling from odorous bodies: with regard to the object, it is the figure and diſpoſition of odorous effluvia, which, ſticking on the organ, excite the ſenſe of ſmelling: and with regard to the ſoul, it is the perception of the impreſſion of the object on the organ, or the affection in the ſoul reſulting therefrom.

The principal organs of ſmelling are the noſtrils, and the olfactory nerves; the minute ramifications of which latter are deſcribed throughout the whole concave of the former.

According to Boerhaave, the act of ſmelling is performed by means of odorous effluvia floating in the air; being drawn into the noſtrils, in inſpiration, and ſtruck with ſuch force againſt the fibrillæ of the olfactory nerves, which the figure of the noſe,

noſe, and the ſituation of the little bones, render oppoſite thereto, as to ſhake them, and give them a vibratory motion; which action, being communicated thence to the common ſenſory, occaſions an idea of a ſweet, or fœtid, or ſour, or an aromatic, or a putrified object, &c. The matter in animals, vegetables, foſſils, &c. which chiefly affects the ſenſe of ſmelling, Boerhaave obſerves, is that ſubtile ſubſtance inherent in the oily parts thereof, called ſpirit; for that, when this is taken away from the moſt fragrant bodies, what remains has ſcarce any ſmell at all; but this, poured on the moſt inodorous bodies, gives them a fragrancy.

Willis obſerves, that brutes have, generally, the ſenſe of ſmelling in much greater perfection than man; and by this alone, they diſtinguiſh the virtues and qualities of bodies unknown before; hunt out their food at a great diſtance, as hounds, and birds of prey; or hid among other matters, as ducks, &c. Man having other means of judging of his food, &c. did not need ſo much ſagacity in his noſe; yet have we inſtances of a great deal, even in man. In the Hiſtoire des Antilles, we are aſſured, there are negroes who, by the ſmelling alone, can diſtinguiſh between the footſteps of a Frenchman and a negro.

The chemiſts teach, that ſulphur is the principle of all ſmells, and that thoſe are more or leſs ſtrong, as the ſulphur in the odorous body is more or leſs dried or exalted. Sulphur, they ſay, is the foundation of odours, as ſalt is of ſavours, and mercury of colours. See the article SULPHUR, &c.

Smell, like taſte, conſiſts altogether in the arrangement, compoſition, and figure of the parts, as appears from the following experiments of Mr. Boyle. 1. From a mixture of two bodies, each whereof is of itſelf void of ſmell, a very urinous ſmell may be drawn, that is, by grinding of quick lime with ſal-ammonic. 2. By the admixture of common water, which, of itſelf, is void of all ſmell, or inodorous, another inodorous body may be made to emit a very rank ſmell. Thus camphor, diſſolved in oil of vitriol, is inodorous, yet, mixed with water, immediately exhales a very ſtrong ſmell. 3. Compound bodies may emit ſmells which have no ſimilitude to the ſmell of the ſimples they conſiſt of. Thus oil of turpentine, mixed with a double quantity of oil of vitriol, and diſtilled; after diſtillation, there is no ſmell but of ſulphur, and what is left behind, the retort being again urged by a more violent fire, yields a ſmell like oil of wax. 4. Several ſmells are only to be drawn forth by motion and agitation. Thus glaſs, ſtones, &c. which even when heated yield no ſmell, yet, when rubbed and agitated in a peculiar manner, emit a ſtrong ſmell; particularly beech-wood, in turning, yields a kind of roſy ſmell. 5. A body that has a ſtrong ſmell, by being mixed with an inodorous one, may ceaſe to have any ſmell at all. Thus if aqua-fortis, not well dephlegmated, be poured on ſalt of tartar, till it ceaſes to ferment, the liquor, when evaporated, will yield inodorous cryſtals, much reſembling ſalt of nitre; yet when burnt, will yield a moſt noiſome ſmell. 6. From a mixture of two bodies, one whereof ſmells extremely ill, and the other not well, a very pleaſant aromatic odour may be gained, viz. by a mixture of aqua-fortis, or ſpirit of nitre, with an inflammable ſpirit wine. 7. Spirits of wine, by mixing with an almoſt inodorous body, may gain a very pleaſant aromatic ſmell. Thus inflammable ſpirits of wine, and oil of Dantzic vitriol, mixed in equal portions, then digeſted, and at laſt diſtilled, yield a ſpirit of a very fragrant ſmell. 8. A moſt fragrant body may degenerate into a fœtid one, without the admixture of any other body. Thus, if the ſpirit mentioned in the former experiment be kept in a well-cloſed receiver, it will ſoon turn to the rankneſs of garlic. 9. From two bodies, one whereof is inodorous and the other fœtid, a very pleaſant ſmell may ariſe, much reſembling muſk, &c. by putting pearls into ſpirit of vitriol; for, when diſſolved, they yield a very agreeable ſmell.

SMELT, in ichthyology, the oſmerus, with ſeventeen rays in the pinna ani. This is a beautiful little fiſh; its length is five or ſix inches, and its breadth not great in proportion, but the thickneſs is conſiderable: the head is of an oblong figure, and ſomewhat acute; the opening of the mouth is large, the back is convex, and the belly ſomewhat flat; the lower jaw is a little longer than the upper; the noſtrils ſtand in the middle between the eyes and the extremity of the roſtrum; they have each two apertures; the eyes are large and round, the pupil is black, and the iris of a ſilvery white, but tinged a little with blue towards the upper part.

SMELTING, in metallurgy, the fuſion or melting of the ores of metals, in order to ſeparate the metalline part from the earthy, ſtony, and other parts. See the articles FUSION, ORE, FLUX, GOLD, SILVER, &c.

SMILAX, rough bind-weed, in botany, a genus of plants, whoſe flowers are apetalous; they are male and female, growing on different plants; the cups are campanulated, and divided each into ſix ſpreading oblong ſegments, reflexed at the top, and joining at their baſe; the ſtamina of the male flower are ſix filaments, topped with oblong antheræ: the fruit is a globoſe, bilocular berry, containing two round ſeeds.

SMIRIS, in natural hiſtory, the ſame with emery. See the article EMERY.

SMITHERY, or SMITHING, a manual art, by which an irregular lump of iron is wrought into an intended ſhape. See the article FORGE.

SMOKE, or SMOAK, *Fumus*, a humid matter, exhaled in the form of vapour, by the action of fire and heat. See the articles FIRE, HEAT, and EXHALATION.

SMOKE-

SMOKE-SILVER, and SMOKE-PENNY, a payment made to the miniſters of ſeveral pariſhes in lieu of tithe-wood.

SMUGGLERS, in law, thoſe perſons who conceal and run prohibited goods, or goods that have not paid his majeſty's cuſtoms.

SMUT, in huſbandry, a diſeaſe in corn, when the grains, inſtead of being filled with flour, are full of a ſtinking black powder.

As to the cauſe of this diſtemperature, ſome have attributed it to exceſſive rankneſs, or fatneſs of the ſoil; to the manuring the land with rotten vegetables; and to the ſowing ſmutty ſeed. Mr. Bradley thinks it is owing to the ſame cauſe with a blight, viz. to multitudes of inſects. But Mr. Tull is convinced, from experiment, that it is cauſed by too much moiſture; for planting ſeveral plants of corn in troughs of very moiſt earth, they all produced ſmutty ears, while very few ſuch were found in the field, from whence theſe plants were taken.

There are two remedies for the ſmut, recommended by writers on huſbandry, viz. ſteeping the ſeed in ſalt brine, and changing the ſeed. See the articles SEED and CHANGE.

As to the ſteeping of ſeed, when wheat is intended for drilling, it muſt be ſoaked in a brine of pure ſalt, diſſolved in water, ſince urine is found to be highly prejudicial. The moſt expeditious way of brining wheat for drilling, is to lay it in a heap, and waſh it with a ſtrong brine ſprinkled on it, ſtirring it up with a ſhovel, that it may be all equally brined, or wetted with it: after this, ſift on ſome fine lime all over the ſurface, and ſtir it up, ſtill ſifting on more in the ſame manner till the whole is duſted with the lime; it will then ſoon be dry enough to be drilled without farther trouble. It muſt be quick-lime in its full ſtrength, that is uſed on this occaſion.

The bread made of ſmutty corn is very pernicious, acting as a narcotic, and occaſioning not only ſleepineſs, but vertigoes, and even convulſions.

SMYRNIUM, *Alexanders*, or *Aleſanders*, in botany. See the article ALESANDERS.

SNAFFLE, in the manege, is a very ſlender bit-mouth, without any branches, much uſed in England; the true bridles being reſerved for the ſervice of war.

The ſnaffle, or ſmall watering-bit, is commonly a ſcratch-mouth, with two very little ſtraight branches, and a curb, mounted with a head-ſtall, and two long reins.

SNAIL, *Limax*, in zoology, a genus of the gymnarthria, or naked inſects; the body of which is of a figure approaching to cylindric, and is perforated at the ſide; the tentacula, or horns, as they are called, are four in number, and two of them have the appearance of eyes.

Snails are all hermaphrodites, and eſteemed provocatives by the Aſiatics.

SNAKE, *Anguis*, in zoology. See the article ANGUIS.

The common ſnake is a harmleſs and inoffenſive animal, and might even be kept tame in houſes to deſtroy vermin: its fleſh is reſtorative, like that of the viper. See the article VIPER.

For the blood-ſnake, rattle-ſnake, &c. ſee HÆMORRUS, RATTLE-SNAKE, &c.

SNAKE-ROOT, *Serpentaria*, in botany. See the article SERPENTARIA.

Rattle-SNAKE-ROOT, *Polygala*, in botany. See the article POLYGALA.

SNAKE-STONE, a name given to the ammonitæ. See AMMONITÆ.

SNAKE-WEED, *Polygonum*, in botany. See POLYGONUM.

SNAP-DRAGON, *Antirrhinum*, in botany. See ANTIRRHINUM.

SNATCH-BLOCK, among ſeamen, a kind of pulley. See PULLEY.

SNEEZING, *Sternutatio*, a convulſive motion of the muſcles of the breaſt, whereby the air is expelled from the noſe, with much vehemence and noiſe.

Sneezing is cauſed by the irritation of the upper membrane of the noſe, occaſioned by acrid ſubſtances floating in the air, or by medicines called ſternutatories.

SNEEZWORT, *Ptarmica*, in botany. See PTARMICA.

SNIPE, in ornithology, a ſpecies of numenius, with four brown ſtreaks on the back; it is a ſmall but beautiful bird, and its fleſh is delicate, and much eſteemed at table.

SNOW, *Nix*, in meteorology, a meteor produced in this manner: when the vapours are become conſiderably condenſed, yet not ſo far as to be liquified, or diſſolved into water; then by a ſpecial degree of coldneſs in the upper region of the air, the particles of the condenſed vapour are changed into ice; ſeveral of which adhering together, form little fleeces of a white ſubſtance, ſomewhat heavier than the air; and therefore deſcend in a ſlow and gentle manner through it; being ſubject, by reaſon of its lightneſs, to be driven about by the various motions of the air and wind; and is what, when arrived to the ſurface of the earth, we call ſnow. See FROST, HAIL, &c.

The uſes of ſnow muſt be very great, if all be true Bartholin has ſaid in its behalf, in an expreſs treatiſe, *De Nivis Uſa Medico*; he there ſhews, that it fructifies the earth (which, indeed, is a very old and general opinion) preſerves from the plague, cures fevers, cholics, tooth-achs, ſore eyes, and pleuriſies; for which laſt uſe, his countrymen of Denmark uſe to keep ſnow-water gathered in March. He adds, that it contributes to the prolongation of life; giving inſtances of people in the Alpine mountains that live to great ages; and to the

the preſerving dead bodies, inſtances whereof he gives of perſons buried under the ſnow in paſſing the Alps, which are found uncorrupted in the ſummer, when the ſnow is melted.

He obſerves, that, in Norway, ſnow-water is not only their ſole drink in the winter, but ſnow even ſerves for food; people having been known to live ſeveral days, without any other ſuſtenance.

Indeed, the generality of theſe medicinal effects of ſnow, are not to be aſcribed to any ſpecific virtue in ſnow, but to other cauſes. It fructifies the ground, for inſtance, by guarding the corn or other vegetables, from the intenſer cold of the air, eſpecially the cold piercing winds. And it preſerves dead bodies, by conſtipating and binding up the parts, and thus preventing all ſuch fermentations or internal conflicts of their particles, as would produce putrefaction.

Snow may be preſerved by ramming it down in a dry place, under-ground, and covering it with chaff, in the manner of ice. See ICE.

SNOWDROP, *Galanthus*, in botany. See GALANTHUS.

SNOWDROP-TREE, the ſame with the chionanthus. See CHIONANTHUS.

SNUFF, a powder chiefly made of tobacco, the uſe of which is too well known to need any deſcription here. See TOBACCO.

However, though tobacco be the baſis of ſnuff, yet a multiplicity of other matters are often added, to give it an agreeable ſcent.

SOAL-FISH, *Solea*, in ichthyology, the Engliſh name of the long-bodied pleuronectes, with rough ſcales on both ſides. See PLEURONECTES.

SOAP, or SOPE, in commerce, and the manufactures, a kind of paſte, ſometimes hard and dry, and ſometimes ſoft and liquid, much uſed in waſhing, whitening linens, and by dyers, fullers, &c.

The principal ſoaps of our manufacture, are the ſoft, the hard, and the ball ſoap; all which conſiſt of an intimate union of the ſalt of pot-aſh, with oil, or animal fat.

1. The ſoft-ſoap is either green or white. The principal ingredients in the green kind are leys drawn from pot-aſhes, and lime boiled up with tallow and oil.

Firſt, the ley and tallow are put into the copper together, and, when melted, the oil is put to them, and the copper made to boil; then they damp or ſtop up the fire, while the ingredients remain in the copper to knit or incorporate; which being done, they ſet the copper boiling again, feeding or filling it with leys as it boils, till they have put in a ſufficient quantity; after which they boil it off with all convenient ſpeed, and put it into barrels.

One ſort of white-ſoap is made after the ſame manner with green-ſoap, excepting that they do not uſe any oil in this. Another ſort of white ſoap is made from leys of aſhes of lime, boiled up twice with tallow.

Firſt, they put a quantity of leys and tallow into the copper together, which is kept boiling, being fed with leys as it boils, till it is boiled enough, or that they find it grains; then they ſeparate or diſcharge the leys from the tallowiſh part, which they put into a tub, throwing away the ley: this they call the firſt half-boil. Then they charge the copper again with freſh tallow and ley, and put the firſt half-boil out of the tub into the copper a ſecond time, and keep it boiling with freſh ley and tallow, till it is brought to perfection, and afterwards filled out into ſoap-caſks.

2. Hard-ſoap is made of aſhes and tallow, and commonly boiled at twice; the firſt boiling they alſo call a half-boiling, which is performed exactly after the ſame manner as the firſt half-boil of the ſoft white-ſoap. Then they charge the copper again with freſh ley, and put into it the firſt half-boil again, feeding it with ley as it boils, till it is boiled enough, or till it grains; then they diſcharge the ley from it, and put the ſoap into a frame to boil and harden.

3. Ball-ſoap is made alſo of ley from aſhes and tallow; they put the ley into the copper, and boil it till the watery part is quite gone, and there is nothing left in the copper but a ſort of nitrous matter (which is the very ſtrength and eſſence of the ley) then they put tallow to it, and keep the copper boiling and ſtirring for half an hour or more, in which time the ſoap is completed, which they put into tubs or baſkets with ſheets in them, and immediately (while ſoft) make it into balls.

It takes up near twenty-four hours to boil away the watery part of the ley.

The proceſs of ſoap-boiling, as at preſent practiſed, being a very tedious, as well as expenſive, operation, Dr. Shaw propoſes a method to ſhorten it, by ſubſtituting motion in the place of fire: this motion might be eaſily given, by an engine, to any quantities of the ingredients at a time; and that ſuch a method is effectual for making ſoap, the doctor proved by the following experiment: he mixed, in a large phial, half a pint of ſoap-ley, with an ounce, or more, of oil-olive; and ſhaking theſe together for a quarter of an hour, a true cake of ſoap was obtained on the top of the liquor, which hardened on being expoſed to the air.

SOAP-EARTH, or SOAP-ROCK, in natural hiſtory. See STEATITES.

SOAP-WORT, *Saponaria*, in botany. See SAPONARIA.

SOC, or SOK, *Soca*, in law-books, denotes juriſdiction. See JURISDICTION.

SOCAGE, an ancient tenure, by which lands were held on condition of ploughing the lord's lands, and doing the operations of huſbandry,

at their own charges. See the articles TENURE and HUSBANDRY.

SOCCUS, in antiquity, a kind of high ſhoe, reaching above the ancle, worn by comedians, as the cothurnus was by tragedians. See COTHURNUS, COMEDY, TRAGEDY, and DRAMA.

SOCIETY, *Societas*, in general, denotes a number of perſons united together for their mutual aſſiſtance, ſecurity, intereſt, or entertainment.

Royal SOCIETY, an academy, or college, eſtabliſhed by charter, by king Charles II. for promoting natural knowledge, and uſeful arts, by experiments. See the article ACADEMY.

It conſiſts of ſeveral hundred fellows, or members, moſtly Britiſh; ſome perſons of the higheſt rank, and many eminent gentlemen and learned men of other nations.

Their meetings are held once a week, at their houſe in Crane-Court, Fleet-Street, London; where they diſcourſe upon the productions and rarities of nature and art, and conſider how the ſame may be improved for the good of mankind: here are alſo read letters, and other philoſophical papers, ſent by ingenious perſons, both at home and abroad; upon which they diſcourſe in the plaineſt manner, without affecting ſtudied ſpeeches.

This ſociety, of which his Britannic majeſty is perpetual patron, is governed by a council of twenty-one members, ten of whom are yearly choſen out of the ſociety, on St. Andrew's day: the chief of the council bears the title of Preſident, whoſe proper office is to call and diſſolve the meetings, to propoſe the matter to be debated, call for experiments, and admit ſuch members as ſhall be elected, which muſt be by a majority of at leaſt twenty-one votes; whereupon he is admitted, after paying 40*s.* and ſubſcribing, that he will endeavour to promote the good of the Royal Society of London, by the improvement of natural knowledge; and being thus admitted, he afterwards pays 13*s.* a quarter, as long as he continues a member of the ſociety.

SOCINIANS, in church hiſtory, a ſect of Chriſtian heretics, ſo called from their founder Fauſtus Socinus, a native of Sienna, in Italy.

He, about the year 1574, began openly to declare againſt the Catholic faith, and taught, 1. That the Eternal Father was the one only God; that the Word was no more than an expreſſion of the Godhead, and had not exiſted from all eternity; and that Jeſus Chriſt was God no otherwiſe than by his ſuperiority over all creatures who were put in ſubjection to him by the Father.

2. That Jeſus Chriſt was not a mediator between God and men, but ſent into the world to ſerve as a pattern of their conduct; and that he aſcended up to heaven only as it were to take a journey thither.

3. That the puniſhment of hell will laſt but for a certain time, after which the body and ſoul will be deſtroyed.

And, 4. That it is not lawful for princes to make war.

Theſe four tenets were what Socinus defended with the greateſt zeal. In other matters, he was a Lutheran or a Calviniſt; and the truth is, that he did but refine upon the errors of all the Antitrinitarians that went before him.

The Socinians ſpread extremely in Poland, Lithuania, and Tranſylvania. Their ſentiments are explained at large in their catechiſm, printed ſeveral times under the title of Catecheſis Eccleſiarum Polonicarum, unum Deum Patrem, illiuſque Filium unigenitum, una cum Sancto Spiritu, ex ſacra ſcriptura confitentium. They were exterminated out of Poland in 1655, ſince which time they have been chiefly ſheltered in Holland, where, though their public meetings have been prohibited, they find means to conceal themſelves under the names of Arminians and Anabaptiſts. See the article ARMINIAN.

SOCLE, or ZOCLE, in architecture, a flat ſquare member under the baſes of pedeſtals of ſtatues, vaſes, &c. which ſerves as a foot or ſtand.

Continued ſocle, is a kind of continued ſtand or pedeſtal without either baſe or corniche, ranging round the whole building, called by Vitruvius, ſtereobata. See the article STEREOBATA.

SOCMEN, or SOKEMEN, ſuch tenants as held their lands and tenements in ſocage; but the tenants in ancient demeſne, ſeem moſt properly to be called ſocmans. See the article SOCAGE.

SOCNA, in our old writers, denotes ſome privilege, liberty, or franchiſe.

SOCOME, is taken for a cuſtom of grinding corn at the lord's mill; whence came the name or term of bond ſocome, by which the tenants were bound to it; and alſo love ſocome, where they did it voluntarily out of love to their lord.

SOCRATIC PHILOSOPHY, the doctrines and opinions, with regard to morality and religion, maintained and taught by Socrates.

By the character of Socrates, left us by the ancients, particularly by his ſcholars Plato, Laertius, &c. he appears to have been one of the beſt and the wiſeſt perſons in all the heathen world. To him is aſcribed the firſt introducing of moral philoſophy, which is what is meant by that uſual ſaying, that "Socrates firſt called philoſophy down from heaven to earth;" that is, from the contemplation of the heavens and heavenly bodies, he led men to conſider themſelves, their own paſſions, opinions, faculties, duties, actions, &c. He wrote nothing himſelf, yet all the Grecian ſects of philoſophers refer their origin to his diſcipline, particularly the Platoniſts, peripatetics, academics, cyrenaics, ſtoics, &c. but the greateſt part of his philoſophy we have in the works of Plato. See the article PLATONISM.

SODOMY, the unnatural crime of buggery, thus called from the city of Sodom, which was deſtroyed

ſtroyed by fire for the ſame. The Levitical law adjudged thoſe guilty of this execrable crime to death, and the civil law aſſigns the ſame puniſhment to it. Our law alſo makes it felony.

There is no ſtatute in Scotland againſt ſodomy; the libel of this crime is therefore founded on the divine law, and practice makes its puniſhment to be burning alive.

SOFA, in the Turkiſh cuſtoms, a bench of wood, raiſed from the ground about a foot high, and placed round a hall or chamber for the people to ſit down upon, or to lie along, and in that poſture to take a view of what paſſes in the ſtreets, &c. for theſe benches are ſurrounded with windows; they are covered with fine Turky carpets; and upon that are placed cuſhions of ſattin flowered with gold, or ſome other rich ſtuff.

SOFFITA, or SOFFIT, in architecture, any plafond or ceiling formed of croſs beams of flying corniches, the ſquare compartiments or pannels of which are enriched with ſculpture, painting, or gilding; ſuch are thoſe in the palaces of Italy, and in the apartments of Luxembourgh at Paris. This word is particularly uſed for the under ſide or face of an architrave, and for that of the corona or larmier, which the ancients called lacunar, the French plafond, and we uſually the drip. It is enriched with compartiments of roſes, and has eighteen drops in the Doric order diſpoſed in three ranks, ſix in each, placed to the right-hand of the guttæ, and at the bottom of the triglyphs.

SOFTENING, in painting, the mixing and diluting of colours with the bruſh or pencil. To ſoften deſigns in black and white made with the pen, &c. ſignifies to weaken the tint. To ſoften a portrait, according to Felibien, is to change ſome of the ſtrokes, and give a greater degree of ſweetneſs and ſoftneſs to the air thereof, which before had ſomething rough and harſh in it.

SOGETTO, ſubject, in muſic, is uſed for a ſong or melody, above or below which ſome counterpoint is to be made: a counterpoint above the ſubject, is when the lower part is the ſubject; in this ſenſe it is called canto fermo. When the counterpoint is made below the ſubject, the upper part is made the ſubject. If this ſubject does not change the figure or ſituation of notes, be it above or below the counterpoint, it is called the invariable ſubject; and if it changes, the variable ſubject. Sogetto is alſo uſed for the words to which ſome compoſitions are to be adapted. And laſtly, this word is made uſe of for a ſucceſſion of many notes of one, two, or more meaſures, diſpoſed in ſuch a manner as to form one or more fugues. See COUNTERPOINT, &c.

SOIL, *Solum*, in agriculture and gardening, denotes earth or ground, conſidered with regard to the quality of its mould for the production and growth of vegetables. See the article EARTH.

The land of England, as conſidered by the farmer, is reduced into nine ſorts of ſoil: the ſandy, the gravelly, the chalky, the ſtony, the rocky, the hazely, the black earth, the marſh, and the clay-land. See the articles SAND, GRAVEL, &c.

SOIT FAIT COMME IL EST DESIRE', *Be it done as it is deſired*, a form uſed when the king gives the royal aſſent to a private bill preferred in parliament.

SOL, in muſic, the fifth note of the gamut, *ut, re, mi, fa, ſol, la*. See GAMUT.

SOLÆUS, or SOLARIS, in anatomy, one of the extenſor muſcles of the foot, riſing from the upper and hinder part of the tibia and fibula. This is a large and fat muſcle, thicker at the middle than at the edges, and is nearly of an oval figure.

SOLANDRA, in botany, a genus of plants, producing male and female flowers, which grow in an umbel; the male flower has five equal petals, and the female ſix of the ſame form: the fruit is an oblong capſule, containing a ſingle ſeed.

SOLANUM, nightſhade, in botany, a genus of plants, whoſe flower is monopetalous and rotated, the corolla of which is very ſhort, and the limb is divided half through into five large plicated pointed ſegments, it contains five ſmall ſubulated filaments, topped with oblong connivent antheræ; the fruit is a round ſmooth berry, punctated at the top, containing two cells, which are filled with roundiſh compreſſed ſeeds, and placed on a convex fleſhy receptacle.

This genus includes the melongena and lycopersicon of Tournefort.

The common nightſhade riſes a firm angular ſtalk, to the height of a foot and a half, of a blackiſh-green colour, and divided into ſeveral branches; the leaves are oblong, acute-pointed, ſmooth, of a dark colour, and full of a greeniſh juice; it grows wild in gardens, dunghills, on the ſide of highways, &c. and flowers in September. This plant is uſed to allay inflammations, to ſoften and relax the fibres which undergo too violent a tenſion: the bruiſed herb is applied to the piles, or the part bathed with the juice a little warmed; internally it is ſeldom uſed, being often attended with dangerous conſequences.

SOLAR, ſomething belonging to the ſun: thus the ſolar ſyſtem is that ſyſtem of the world wherein the heavenly bodies are made to revolve round the ſun as the center of their motion. See COPERNICAN.

Alſo the ſolar year is that conſiſting of three hundred and ſixty-five days, five hours, and forty-nine minutes, in oppoſition to the lunar year, conſiſting of three hundred and fifty-four days.

SOLDANELLA, in botany, a plant whoſe root is fibrous and perennial, the leaves are almoſt kidney-ſhaped, of a dark green colour, and ſtand on long foot-ſtalks: the flowers come out in pairs placed on a footſtalk; they are monopetalous and

campanulated, with their edges cut into acute ſegments, and of a blue or white colour: the flower is ſucceeded by an oblong taper capſule obliquely ſtriated, containing one cell, and opening at the top with ten indentures; the ſeeds are numerous, ſmall, and acuminated, with a columnar receptacle.

This plant is a native of the Alps, and the mountains in Germany, and is propagated here by parting the roots in September.

SOLDER, Sodder, or Soder, a metalic or mineral compoſition uſed in ſoldering or joining together other metals. See the next article.

Solders are made of gold, ſilver, copper, tin, biſmuth, and lead; uſually obſerving, that in the compoſition there be ſome of the metal that is to be ſoldered mixed with ſome higher and finer metals. Goldſmiths uſually make four kinds of ſolder, viz. ſolder of eight, where to ſeven parts of ſilver there is one of braſs or copper; ſolder of ſix, where only a ſixth part is copper; ſolder of four, and ſolder of three. It is the mixture of copper in the ſolder that makes raiſed plate come always cheaper than flat. The ſolder uſed by plumbers is made of two pounds of lead to one of block-tin. Its goodneſs is tried by melting it and pouring the bigneſs of a crown-piece upon a table; for if good, there will ariſe little bright ſhining ſtars therein. The ſolder for copper is made like that of the plumbers, only with copper and tin; for very nice works, inſtead of tin they ſometimes uſe a quantity of ſilver. Solder for tin is made of two thirds of tin and one of lead; but where the work is any thing delicate, as in organ-pipes, where the juncture is ſcarce diſcernable, it is made of one part of biſmuth and three parts of pewter.

SOLDERING, among mechanics, the joining and faſtening together two pieces of the ſame metal, or of two different metals, by the fuſion and application of ſome metallic compoſition on the extremities of the metals to be joined. See the laſt article.

To ſolder upon ſilver, braſs, or iron: take ſilver, five penny-weight; braſs, four penny-weight; melt them together for ſoft-ſolder, which runs ſooneſt. Take ſilver five penny-weight; copper, three penny-weight; melt them together for hard ſolder. Beat the ſolder thin, and lay it on the place to be ſoldered, which muſt be firſt fitted and bound together with wire, as occaſion requires; then take borax in powder, and temper it like pap, and lay it upon the ſolder, letting it dry; then cover it with quick coals, and blow, and it will run immediately; take it preſently out of the fire, and it is done. It is to be obſerved, that if any thing is to be ſoldered in two places, which cannot well be done at one time, you muſt firſt ſolder with the harder ſolder, and then with the ſoft; for if it be firſt done with the ſoft, it will unſolder again before the other is ſoldered. Let it be obſerved, that if you would not have your ſolder run about the piece that is to be ſoldered, you muſt rub ſuch places over with chalk.

In the ſoldering either of gold, ſilver, copper, and all the metals before-mentionee, there is generally uſed borax in powder, and ſometimes roſin. As to iron, it is ſufficient that it be heated red-hot, and the two extremities thus hammered together, by which means they will become incorporated into one another.

SOLDIER, a military man liſted to ſerve a prince or ſtate, in conſideration of a certain daily pay.

The ſoldiers are properly the land forces of a kingdom or ſtate; but in England it is againſt the ancient law to keep an army of ſoldiers in time of peace. Where any ſoldier that is lawfully retained ſhall depart from his colours without licence, he is declared to be guilty of felony by 18 Hen. VI. c. 9. and every ſoldier who either cauſes a mutiny or deſerts the ſervice, ſhall be puniſhed with death or otherwiſe, as a court-martial ſhall think fit. Alſo perſons ſuſpected of deſertion, are to be apprehended by conſtables, who ſhall be allowed a reward of 20 s. for every ſuch deſerter.

By the 4 Geo. I. c. 4. it is ordained, that no ſoldier ſhall be taken out of the ſervice by any proceſs at law, unleſs it be for ſome criminal matter, or where the debt he owes amounts to 10 l. at the leaſt, of which affidavit is to be made, &c. Soldiers muſt be quartered in inns and alehouſes only, and not in private houſes, without the conſent of the owners, under certain penalties: and where victuallers refuſe ſoldiers quartered on them, or conſtables receive any reward for excuſing their neglect, they forfeit a ſum not above 50 l. nor under 30 s. by 3 Geo. II. c. 2. A perſon inliſted for a ſoldier, within four days after, is to be carried before the next juſtice or chief magiſtrate of a town, and is to declare his aſſent that he liſted voluntarily, &c. but if he then diſſents thereto, on his returning the money received, and paying 20 s. he may be diſcharged. In caſe any ſubject of Great-Britain or Ireland ſhall liſt or enter himſelf, or procure any one to be enliſted a ſoldier to go beyond the ſeas, without leave obtained from his majeſty, ſuch perſon ſhall be puniſhed as a felon by 8 and 9 Geo. II. There are acts annually made for puniſhing mutiny, &c. of ſoldiers and falſe muſters, and for the better payment of the army and their quarters, &c. See Court-Martial.

SOLE, in the manege, a nail or ſort of horn under a horſe's foot, which is much more tender than the other horn that encompaſſes the foot, and by reaſon of its hardneſs is properly called the horn or the hoof. A horſe's ſhoe ought to be ſo ſet upon the hoof as not to bear upon the ſole, for otherwiſe the ſole will be hurt, and not only make the horſe lame, but corrupt the fleſh that ſeparates it from the coſ-

coffin-bone. To take out the ſole, is to do it without touching the horn of the hoof; or if you take off the horn, you make a hoof-caſt.

SOLE-TENANT, one that holds lands, &c. by his own right only, without any other perſon joined.

A perſon muſt be ſeiſed of a ſole-eſtate to deviſe the ſame by will, or for the wife to have a dower therein, &c. And where a man and his wife hold land for their lives, the remainder to their ſon, in that caſe, if the man dies the lord ſhall not have heriot, becauſe he does not die ſole-tenant.

SOLECISM, *Soloeciſmus*, in grammar, a falſe manner of ſpeaking, contrary to the uſe of language and the rules of grammar, either in reſpect of declenſion, conjugation, or ſyntax.

SOLEMN, *Solennis*, ſomething performed with much pomp, ceremony, and expence: thus we ſay, ſolemn feaſts, ſolemn funerals, ſolemn games, &c. See the articles FEAST, FUNERAL, &c.

Solemn, in law, ſignifies ſomething authentic, or that is cloathed in all its formalities.

SOLFAING, in muſic, the naming or pronouncing the ſeveral notes of a ſong, by the ſyllables *ut*, *re*, *mi*, *fa*, *ſol*, &c. and in learning to ſing it.

Of the ſeven notes in the French ſcale *ut*, *re*, *mi*, *fa*, *ſol*, *la*, *ſi*, only four are uſed among us in ſinging, as *mi*, *fa*, *ſol*, *la*: their office is principally in ſinging, that by applying them to every note of the ſcale, it may not only be pronounced with more eaſe, but chiefly that by them the tones and ſemitones of the natural ſcale may be better marked out and diſtinguiſhed. This deſign is obtained by the four ſyllables *fa*, *ſol*, *la*, *mi*. Thus from *fa* to *ſol* is a tone, alſo from *ſol* to *la*, and from *la* to *mi*, without diſtinguiſhing the greater or leſs tone; but from *la* to *fa*, alſo from *mi* to *fa*, is only a ſemitone. If then theſe be applied in this order, *fa*, *ſol*, *la*, *fa*, *ſol*, *la*, *mi*, *fa*, &c. they expreſs the natural ſeries from C; and if that be repeated to a ſecond or third octave, we ſee by them how to expreſs all the different orders of tones and ſemitones in the diatonic ſcale; and ſtill above *mi* will ſtand *fa*, *ſol*, *la*, and below it the ſame inverted *la*, *ſol*, *fa*, and one *mi* is always diſtant from another an octave, which cannot be ſaid of any of the reſt, becauſe after *mi* aſcending come always *fa*, *ſol*, *la*, *fa*, which are repeated invertedly deſcending.

To conceive the uſe of this, it is to be remembered, that the firſt thing in learning to ſing, is to make one raiſe a ſcale of notes by tones and ſemitones to an octave, and deſcend again by the ſame; and then to raiſe and fall by greater intervals at a leap, as thirds and fourths, &c. and to do all this by beginning at notes of different pitch. Then thoſe notes are repreſented by lines and ſpaces, to which theſe ſyllables are applied, and the learners taught to name each line and ſpace thereby, which makes what we call ſolfaing, the uſe whereof is, that while they are learning to tune the degrees and intervals of ſound, expreſſed by notes on a line or ſpace, or learning a ſong to which no words are applied, they may not only do it the better by means of articulate ſounds, but chiefly, that by knowing the degrees and intervals expreſſed by thoſe ſyllables, they may more readily know the places of the ſemitones, and the true diſtance of the notes. See the article SINGING.

SOLICITOR, or SOLLICITOR, *Solicitator*, a perſon employed to take care of, and manage ſuits depending in the courts of law and equity; and thoſe of the lower ſort, it is obſerved, are too often made uſe of, to the damage of the people, and the increaſe of champerty and maintenance. Solicitors are within the ſtatute to be ſworn and admitted by the judges, before they are allowed to practiſe in our courts, in like manner as attornies.

There is alſo a great officer of the law, next to the attorney-general, who is ſtiled the king's ſolicitor-general; who holds his office by patent, during the king's pleaſure; has the care and concern of managing the king's affairs, and has fees for pleading, beſides other fees ariſing by patents, &c. He hath his attendance on the privy-council; and the attorney-general and he were anciently reckoned among the officers of the exchequer; they have their audience, and come within the bar in all other courts.

SOLID, in philoſophy, a body whoſe parts are ſo firmly connected together, as not to give way, or ſlip from each other, upon the ſmalleſt impreſſion: in which ſenſe, ſolid ſtands oppoſed to fluid.

Geometricians define a ſolid to be the third ſpecies of magnitude, or that which has three dimenſions, viz. length, breadth, and thickneſs or depth.

A ſolid may be conceived to be formed by the revolution, or direct motion, of a ſuperficies of any figure whatever, and is always terminated or contained under one or more planes or ſurfaces, as a ſurface is under one or more lines.

Solids are commonly divided into regular and irregular. The regular ſolids are thoſe terminated by regular and equal planes, and are only five in number, viz. the tetrahedron, which conſiſts of four equal triangles; the cube, or hexahedron, of ſix equal ſquares; the octahedron, of eight equal triangles; the dodecahedron, of twelve; and the icoſihedron, of twenty equal triangles. See the articles TETRAHEDRON, CUBE, OCTAHEDRON, &c.

The irregular ſolids are almoſt infinite, comprehending all ſuch as do not come under the definition of regular ſolids; as the ſphere, cylinder, cone, parallelogram, priſm, parallelopiped, &c. See the articles SPHERE, CYLINDER, &c.

SOLID *Angle*, is that formed by three or more planes meeting in a point, like the point of a diamond well cut.

SOLID *Baſtion*. See BASTION.

SOLID *Numbers*, are thoſe which ariſe from the multiplication of a plane number, by any other whatſoever; as 18 is a ſolid number made of 6 (which is plane) multiplied by 3; or of 9 multiplied by 2.

SOLID *Problem*, in mathematics, is one which cannot be geometrically ſolved, unleſs by the interſection of a circle and a conic ſection: or, by the interſection of two other conic ſections, beſides the circle.

As to deſcribe an iſoſceles-triangle on a given right-line, whoſe angle at the baſe ſhall be triple to that at the vertex.

Line of SOLIDS, on the ſector. See the article SECTOR.

SOLIDS, in anatomy, &c. denote the continent parts of the human body; being a congeries of pipes or veſſels, which contain a liquor.

The ſolid parts of the body, though equally compoſed of veſſels, are different with regard to their conſiſtence; ſome being hard, and others ſoft. The hard, as the bones and cartilages, give firmneſs and attitude to the body, and ſuſtain the other parts. The ſoft parts, either alone or together with the hard, ſerve to execute the animal functions.

SOLIDAGO, golden-rod, in botany, a genus of plants, whoſe flower is compound and radiated, conſiſting of hermaphrodite and female corollulæ; the hermaphrodite compoſe the diſc, and are numerous and funnel-ſhaped; the female florets are ligulated, ſpear-ſhaped, and tridentated: the ſeeds are ſolitary, oblong, crowned with a hairy down, and contained in an oblong imbricated cup.

Golden-rod is common in gardens; the flowers are yellow, and produced in ſpikes in Auguſt and September; it is eaſily encreaſed by parting the roots in October.

The leaves, which have a moderately aſtringent and bitter taſte, are eſteemed good in diarrhœas and dyſenteries, and have been much commended formerly as a reſtorative and vulnerary; and likewiſe for their diuretic and lithontriptic qualities.

SOLIDITY, *Soliditas*, that property of matter, or body, by which it excludes all other bodies from the place which itſelf poſſeſſes.

Among geometricians, the ſolidity of a body denotes the quantity or ſpace contained in it, and is called alſo its ſolid content.

SOLIDITY, in architecture, is applied both to the conſiſtence of the ground, whereon the foundation of a building is laid, and to a maſſive in maſonry, of extraordinary thickneſs, without any cavity within.

SOLILOQUY, *Soliloquium*, a reaſoning or diſcourſe which a man holds with himſelf; or, more properly, according to Papias, it is a diſcourſe by way of anſwer to a queſtion, that a man propoſes to himſelf.

Soliloquies are become very common things on the modern ſtage; yet can nothing be more inartificial, or more unnatural, than an actor's making long ſpeeches to himſelf, to convey his intentions to the audience. Where ſuch diſcoveries are neceſſary to be made, the poet ſhould rather take care to give the dramatic perſons ſuch confidants as may neceſſarily ſhare their inmoſt thoughts, by which means they will be more naturally conveyed to the audience: yet is even this a ſhift, an accurate poet would not be found to have occaſion for.

SOLITARIES, a denomination of nuns of St. Peter of Alcantara, inſtituted in 1676, the deſign of which is to imitate the ſevere penitent life of that ſaint; thus they are to keep a continual ſilence, never to open their mouths to any body but themſelves; employ their time wholly in ſpiritual exerciſes, and leave the temporal concerns to a number of maids, who have a particular ſuperior in a ſeparate part of the monaſtery: they always go bare-footed, without ſandals; gird themſelves with a thick cord, and wear no linen.

SOLO, in muſic, a term uſed in pieces conſiſting of ſeveral parts, to mark thoſe that are to perform alone.

SOLOMON'S SEAL, in botany, the Engliſh name of the polygonatum. See the article POLYGONATUM.

SOLSTICE, in aſtronomy, that time when the ſun is in one of the ſolſtitial points; that is, when he is at his greateſt diſtance from the equator, thus called, becauſe he then appears to ſtand ſtill, and not to change his diſtance from the equator for ſome time; an appearance owing to the obliquity of our ſphere, and which thoſe living under the equator are ſtrangers to.

The ſolſtices are two in each year, the æſtival or ſummer-ſolſtice, and the hyemal or winter-ſolſtice: the ſummer ſolſtice is when the ſun ſeems to deſcribe the tropic of cancer, which is on June 22, when he makes the longeſt day: the winter-ſolſtice is when the ſun enters the firſt degree, or ſeems to deſcribe the tropic of capricorn, which is on December 22, when he makes the ſhorteſt day. See the article TROPIC.

This is to be underſtood as in our northern hemiſphere; for in the ſouthern, the ſun's entrance into capricorn makes the ſummer-ſolſtice, and that into cancer the winter-ſolſtice.

The two points of the ecliptic, wherein the ſun's greateſt aſcent above the equator, and his deſcent below it, are terminated, are called the ſolſtitial points; and a circle, ſuppoſed to paſs through the poles of the world and theſe points, is called the ſolſtitial colure.

The ſummer-ſolſtitial point is in the beginning of the

the firſt degree of cancer, and is called the æſtival or ſummer-point; and the winter ſolſtitial point is in the beginning of the firſt degree of capricorn, and is called the winter-point. Theſe two points are diametrically oppoſite to each other.

SOLVENT, the ſame with diſſolvent. See the article DISSOLVENT.

SOLUTION, in chemiſtry, denotes an intimate mixture of ſolid bodies with fluids, ſo as ſeemingly to form one homogene liquor: the diſſolving fluid is termed the diſſolvent or menſtruum.

As to the manner of effecting ſolutions, it varies according to the different ſolvents uſed for that purpoſe, and is reduced to the following heads by Boerhaave: 1. Solution is performed by water, by diluting, infuſing, boiling, diſtilling, mixing, fermenting, putrefying, and ſeparating. 2. With oil, by diluting, infuſing, boiling, diſtilling, mixing, ſeparating; but not by fermenting, or by putrefying. 3. With fire, by calcining, roaſting, burning, melting, ſubliming, mixing, ſeparating, and promoting ſeveral other operations. 4. With the aſſiſtance of air, by fermenting, putrefying, agitating, exciting, and adding other parts capable of diſſolving. 5. With fermented ſpirits, by diluting, infuſing, boiling, diſtilling, mixing, and making oils thinner. 6. With alkaline ſalts, by calcining, torrefying, burning, melting, mixing, and ſeparating, according to the various force of a dry fire employed. 7. By volatile alkaline ſalts, by ſubliming in the dry way; and by diluting, diſtilling, and digeſting in the moiſt way. 8. With fixed alkaline ſalts, aſſiſted and moved by water and fire, by digeſting, boiling, diluting, ſeparating, and mixing. 9. With fixed acid ſalts, as thoſe of alum, ſulphur, and vitriol; either ſeparately in a liquid form, or in their calxes, by diluting, boiling, diſtilling, digeſting: or in a dry form, by calcining, roaſting, burning, and diſtilling. 10. With volatile acid ſalts, by diluting, digeſting, diſtilling and inſinuating. 11. With compound ſalts and ſoaps, by calcining, ſubliming, diſtilling, and digeſting, either in a dry or a liquid form. 12. With metals, by fuſion and amalgamation.

In pharmacy, however, the principal menſtrua are water, vinous ſpirits, oils, and acid and alkaline liquors.

Water is the diſſolvent of all ſalts, vegetable gums, and of animal jellies: of the firſt it diſſolves only a determinate quantity, though of one kind of ſalt more than another; and being thus ſaturated, leaves any additional quantity of the ſame ſalt untouched: but it is never ſaturated with the two latter, uniting readily with any proportions of them, and forming, with different quantities, liquors of different conſiſtencies. When aſſiſted by trituration, it likewiſe diſſolves the vegetable gummy reſins, as ammoniacum and myrrh; the ſolutions of which, though imperfect, or not tranſparent, but turbid and of a milky hue, are nevertheleſs applicable to valuable purpoſes in medicine.

Rectified ſpirit of wine diſſolves the eſſential oils and reſins of vegetables, the pure diſtilled oils of animals, and ſoaps; though it does not act upon the expreſſed oil and fixed alkaline ſalt of which ſoap is made: it alſo, by the aſſiſtance of heat, diſſolves volatile alkaline ſalts, but more eſpecially the neutral ones, as the ſal diureticus, &c.

Oils diſſolve vegetable reſins and balſams, wax, animal fats, mineral bitumens, ſulphur, and certain metallic ſubſtances, particularly lead: however, the expreſſed oils are more powerful menſtrua for moſt of theſe bodies, than the oils obtained by diſtillation; becauſe the former are more capable of ſuſtaining, without injury, a ſtrong degree of heat, which, in moſt caſes, is neceſſary to enable them to act.

Acids diſſolve alkaline ſalts and earths, and metallic ſubſtances: however, the different acids differ greatly in their action upon theſe laſt. The vegetable acids diſſolve a conſiderable quantity of zinc, iron, copper, and tin; and extract ſo much from the metallic part of antimony as to become powerfully emetic: they likewiſe diſſolve lead, if previouſly calcined; but more copiouſly, if corroded by their ſteam. The marine acid diſſolves zinc, iron, and copper; and though it ſcarce acts upon any other metallic ſubſtance, in the common way, may nevertheleſs be artfully combined with them all, except gold: ſuch is the corroſive ſublimate of the ſhops. The nitrous acid is the common menſtruum of all metallic ſubſtances, except gold and the antimonial ſemi-metal, which are ſoluble only in a mixture of the nitrous and marine acids, called aqua regia. The vitriolic acid eaſily diſſolves zinc, iron, and copper: and may be made to corrode, or imperfectly diſſolve, moſt of the other metals.

Alkaline lixivia diſſolves oils, reſins, and ſulphur; but their power is greatly promoted by the addition of quick-lime, as is evident in the making of ſoap and the common cauſtics. Thus aſſiſted, they reduce the fleſh, bones, and other ſolid parts of animals, into a gelatinous matter.

Solutions made in water and in ſpirit of wine, poſſeſs the virtues of the bodies diſſolved: whereas oils generally blunt its activity, and acids and alkalies alter natural qualities. Hence watery and ſpirituous liquors are the only proper menſtrua of the native virtues of vegetable and animal matters.

Moſt of the foregoing ſolutions are eaſily effected by pouring the menſtruum on the body to be diſſolved, and ſuffering them to ſtand together, for ſome time, expoſed to a ſuitable warmth: a ſtrong heat is generally neceſſary to enable oils and alkaline liquors to perform their office. The action of acids is uſually accompanied with heat, effervescence, and a copious diſcharge of fumes. And as the fumes, which ariſe during the diſſolution of ſome metals in the

the vitriolic acid, prove inflammable, the operator ought to be careful, leſt, by the imprudent approach of a candle, the exhaling vapour be ſet on fire.

Solution is much facilitated, by powdering ſuch tenacious bodies as are friable; and ſlicing, or raſping, into ſmall parts ſuch whoſe texture does not admit of being powdered: this, in ſome caſes, is of ſuch importance, that the operation proves extremely tedious, if it be neglected. In ſolutions of metals, earths, or ſalts, with acid ſpirits, care ſhould be taken not to mix them too haſtily, otherwiſe the ebulition will cauſe the mixed liquor to overflow the veſſels; and, in ſome caſes, the unmanageable heat, together with the noxious fumes, will give the operator great embarraſment.

But beſides the ſolutions made by adding fluid menſtruums to the bodies to be diſſolved, there is another kind, called deliquiation, or ſolution per deliquium, in which the moiſture of the air is the menſtruum. It is performed by expoſing the matter to be diſſolved to the air, in cellars, or other damp places; for fixed alkaline and neutral ſalts, and ſome metallic ſalts, being thus expoſed, attract its humidity, and at length become liquid. Some ſubſtances, not diſſoluble by the application of water in its groſſer form, as the butter of antimony, are eaſily liquified by this ſlow action of the aerial moiſture.

SOLUTION, in algebra and geometry, is the anſwering a queſtion, or the reſolving any problem propoſed.

SOLUTION *of continuity*, in ſurgery, is the ſeparation of the natural coheſion of the ſolid parts of the body, by a wound.

SOLUTIVE, an appellation given to laxative and looſening medicines.

Solutive tartar is a preparation of tartar, made by boiling eight ounces of cream of tartar with four ounces of fixed ſalt of tartar.

SON, *filius*, an appellation given to a male child, conſidered in the relation he bears to his parents.

SONATA, in muſic, a piece, or compoſition, intended to be performed by inſtruments only; in which ſenſe it ſtands oppoſed to cantata, or a piece deſigned for the voice.

SONCHUS, the ſow-thiſtle, in botany, a genus of plants whoſe flower is compound and imbricated, being compoſed of a number of ligulated, linear, and quinquedentated corollulæ, each containing five very ſhort capillary filaments, topped with cylindraceous tubulous antheræ: there is no pericarpium; but the cup, which is ventricoſely globular, incloſes the ſeeds, which are oblong, crowned with a piloſe down, and affixed to a naked receptacle.

The common ſow-thiſtle flowers in May and June; and becomes a troubleſome weed, if permitted to ſhed its ſeeds. It is full of a milky bitteriſh juice, and is accounted cooling and attenuant; and accordingly is ſometimes preſcribed in the ſtranguary, and alſo in inflammations of all kinds, to be applied externally in the form of a cataplaſm.

SONG, in poetry, a little compoſition, conſiſting of eaſy and natural verſes, ſet to a tune in order to be ſung.

The ſong much reſembles the madrigal, and ſtill more the ode, which is nothing but a ſong according to the antient rules.

SONG, in muſic, is applied in general to a ſingle piece of muſic, whether contrived for the voice or an inſtrument.

SONNET, in poetry, a compoſition contained in fourteen verſes, *viz.* two ſtanzas, or meaſures, of four verſes each, and two of three; the eight firſt verſes being all in three rhimes.

SOOT, *fuligo*, a volatile matter, ariſing from wood, and other fuel, along with the ſmoke; or rather, it is the ſmoke itſelf, fixed and gathered on the ſides of the chimney.

SOPHISM, *σοφισμα*, in logic, *&c.* an argument which carries much of the appearance of truth, and yet leads into error.

SOPHIST, a perſon who uſes ſophiſms, with a view to deceive thoſe he would perſuade or convince. See the preceding article.

SOPHISTICATION, the adulterating any thing with what is not good or genuine; a practice too common in the making up medicines for ſale; as alſo among vintners, diſtillers, and others, who are accuſed of ſophiſticating their wines, ſpirits, oils, *&c.* by mixing with them cheaper and coarſer materials: and, in many caſes, the cheat is carried on ſo artfully as to deceive the beſt judges.

SOPHORA, in botany, a genus of plants whoſe flower is pentapetalous and papilionaceous. The ſtamina are ten diſtinct parallel ſubulated filaments, hid within the carina, and terminated with ſmall aſſurgent antheræ.

The fruit is a very long and ſlender unilocular pod, containing a number of roundiſh ſeeds.

SOPORIFIC, or SOPORIFEROUS, medicines, are thoſe capable of procuring ſleep, as opiates, *&c.*

SORBUS, the ſervice-tree, in botany, a genus of plants whoſe flower conſiſts of five roundiſh concave petals, which are inſerted in the cup, with twenty filaments, toped with roundiſh antheræ.

The fruit is a ſoft roundiſh umbilicated berry, containing three or four oblong cartilaginous ſeeds.

There are two kinds of ſorbus, one called the wild-ſervice, and the other the manured-ſervice: the former grows naturally in many parts of England in uncultivated mountainous places, and in foreſts and hedges. The trunk is covered with a whitiſh ſmooth bark; but the young branches are of a browniſh red colour. The leaves are winged, and compoſed of eight or nine pair of lobes, and terminated with a ſingle one, and are ſerrated on their edges. The flowers grow in large bunches at the ends of the branches. They appear in May and

and June, and are ſucceeded by berries which turn red in autumn.

The other ſort of ſervice differs but little from the former, excepting the leaves, which are broader and not ſo much ſawed. It grows wild in Italy, and other warm countries: both ſorts may be propagated by ſowing the ſeeds when the fruit is ripe, and the following autumn the plants may be tranſplanted in rows two feet aſunder in the nurſery, where they may remain three or four years, and then be replanted where they are to remain for good.

The fruit of the ſervice is eaten in ſome places; and the wood of the wild ſort is much commended by wheelwrights for being all heart; and it is of great uſe for huſbandmens tools, goads, &c. It is white and ſmooth, and will take a tolerable poliſh.

SORITES, in logic, a ſpecies of reaſoning, in which a great number of propoſitions are ſo linked together, that the predicate of the one becomes continually the ſubject of the next following, till at laſt a concluſion is formed by bringing together the ſubject of the firſt propoſition and the predicate of the laſt: ſuch is the following argument; 'God is omnipotent; an omnipotent being can do every thing poſſible; a being that can do every thing poſſible, can do whatever involves not a contradiction; therefore, God can do whatever involves not a contradiction.

This combination of propoſitions may be continued to any length we pleaſe, without in the leaſt weakening the ground upon which the concluſion reſts; and the reaſon is, becauſe the ſorites may be reſolved into as many ſimple ſyllogiſms as there are middle terms in it; and the concluſion of the laſt ſyllogiſm is univerſally found to be the ſame with the concluſion of the ſorites.

SORRANCE, among farriers, a malady incident to horſes: of which there are two kinds: 1. An evil counted twofold, as either an evil ſtate or compoſition of a horſe's body; which is to be obſerved either by the ſhape, number, quantity, or ſight of the member ill affected or diſeaſed. 2. It is uſed for the looſening and diviſion of an unity, which as it may change diverſely, ſo it has divers names accordingly; for if ſuch a looſening and diviſion be in a bone, then it is called a fracture; if in any fleſhy part, a wound or ulcer; if in the veins, a rupture; if in the ſinews, a convulſion or cramp; and if in the ſkin, an excoriation.

Sorrance-water is a ſolution of Roman-vitriol and ſome other ingredients, in vinegar: it is much eſteemed as a remedy in many of the diſeaſes of horſes, but eſpecially the ſorrance; whence the name.

SORREL, *Acetoſa*, in botany, a ſpecies of rumex. See the article RUMEX.

The common ſorrel is a ſmall plant of the fields, but in gardens it produces larger leaves; the leaves are acid and grateful to the ſtomach; they are cool, and quench thirſt; and their decoction makes a uſeful drink in fevers; it is excellent againſt the ſcurvy; and in ſome cold countries they employ a mixture of the juices of ſorrel and ſcurvy-graſs againſt this diſeaſe with ſucceſs.

The round-leaved, or French ſorrel, differs but little from the former, excepting the leaves, which are ſometimes almoſt round; this is the beſt ſort for kitchen uſe, for which purpoſe it is often cultivated in gardens, by parting the roots and planting them about a foot aſunder.

SORREL-COLOUR, in the manege, is a reddiſh colour, generally thought to be a ſign of a bad horſe.

SORTILEGE, *Sortilegium*, a ſpecies of divination, performed by means of ſortes or lots.

The ſortes preniſtinæ, famous in antiquity, conſiſted in putting a number of letters, or even whole words, into an urn, and then, after ſhaking them together, they were thrown on the ground, and whatever ſentences could be made out from them conſtituted the anſwer of the oracle.

Another kind of ſortes conſiſted in taking ſome celebrated poet, as Homer or Virgil, and opening the book, whatever preſented itſelf firſt to the eye, made the anſwer: and hence it got the name of ſortes Homericæ, and ſortes Virgilianæ, &c.

The ſuperſtitious among the ancient Chriſtians practiſed a ſimilar kind of divination, by opening the Old and New Teſtament; whence it got the name of ſortes ſanctorum.

SORY, or RUSMA, in natural hiſtory, a vitriolic mineral, formed of metalline, ſulphureous, and earthy matter; being truly an ore of blue vitriol, or of the vitriol of copper alone, there not appearing to be a grain of any thing approaching to the nature of iron in it.

It is found in looſe maſſes of different ſizes, and moſtly of a blackiſh colour, though ſometimes reddiſh or bluiſh, It is found in many parts of Turky and in Germany, where it is wrought for blue vitriol, which may be ſeparated from it by a very eaſy proceſs, by powdering the ſory, then expoſing it to a moiſt air for three or four days, and laſtly, boiling it in ſix times its weight of water: for if this liquor be filtrated and evaporated in the uſual manner to a pellicle, and then ſet in a cool place to ſhoot, there will be found cryſtals of pure blue vitriol adhering to the ſides of the veſſel.

SOSPIRO, in the Italian muſic, denotes a pauſe equal to the time of a crotchet.

SOTERIA, in antiquity, ſacrifices offered to the gods for delivering a perſon from danger; as alſo poetical pieces compoſed for the ſame purpoſe.

SOU, or SOL, a French coin. See the article COIN.

SOUGH, among miners, denotes a paſſage dug under ground, to convey off water from mines.

SOVERAIGN, *Supremus*, ſtrictly ſpeaking, ſignifies the Supreme Being, or God. See the article GOD.

SOVERAIGN, in matters of government, is applied to the ſupreme magiſtrate, or magiſtrates, of an independant government or ſtate; by reaſon their authority is only bounded by the laws of God, of nature, and the fundamental laws of the ſtate: ſuch are kings, princes, &c.

SOVERAIGN is alſo an appellation given to the ſupreme courts of judicature. See the article COURT.

SOUL, *Anima*, in philoſophy, a ſpiritual ſubſtance, which animates the bodies of living creatures: it is the principal of life and activity within them. See the articles ANIMAL, LIFE, SPIRIT, &c.

Various have been the opinions of philoſophers concerning the ſubſtance of the human ſoul. The Epicureans thought it a ſubtle air, compoſed of their atoms, or primitive corpuſcles. The Stoics, on the contrary, maintained it was a flame, or portion of heavenly light. And the Carteſians make thinking the eſſence of the ſoul. Others, again, hold, that man is endowed with three kinds of ſoul, viz. the rational, which is purely ſpiritual, and infuſed by the immediate inſpiration of God; the irrational or ſenſative, which being common to man and brutes, is ſuppoſed to be formed of the elements; and laſtly, the vegetative ſoul, or principle of growth and nutrition, as the firſt is of underſtanding, and the ſecond of animal life.

Lord Bacon obſerves, that there are many excellencies in the human ſoul above thoſe of brutes; and that where ſo many and ſuch great excellencies are found, a ſpecific difference ſhould always be made. Hence he highly diſapproves of the confuſed and promiſcuous manner of philoſophers in treating of the functions of the human ſoul, as if it differed in degree rather than kind from the ſouls of brutes. However, he allows, that the doctrine concerning the rational ſoul of man muſt be deduced from revelation: for as its ſubſtance, in its creation, was not formed out of the maſs of heaven and earth, but immediately inſpired by God; and as the laws of the heavenly bodies, together with thoſe of our earth, make the ſubject of philoſophy, ſo no knowledge of the ſubſtance of the rational ſoul can be had from philoſophy. But he might have ſaid the ſame of corporeal ſubſtances, ſince, as Mr. Locke juſtly obſerves, we have no idea of one more than of the other. See ESSENCE.

It is only from the primary, or eſſential, qualities of body, viz. extenſion, ſolidity, &c. that we form an idea of it; and why may we not frame the complex idea of a ſoul, or ſpirit, from the operations of thinking, underſtanding, willing, &c. which are experiments in ourſelves? This idea of an immaterial ſubſtance is as clear as that we have of a material one: for though this notion of immaterial ſubſtances may be attended with difficulties, we have no more reaſon to deny or doubt of its truth, than we have to deny or doubt of the exiſtence of the body.

That the ſoul is an immaterial ſubſtance appears from hence, that its primary operations of willing and thinking have not only no connection with the known properties of body, but ſeem plainly inconſiſtent with ſome of its moſt eſſential qualities. For the mind not only diſcovers no relation between thinking and the motion and arrangement of parts; but it likewiſe perceives that conſciouſneſs, a ſimple act, can never proceed from a compounded ſubſtance, capable of being divided into many parts. To illuſtrate this, let us only ſuppoſe a ſyſtem of matter endowed with thought; then either all the parts of which this ſyſtem conſiſts, muſt think, which would make it not one but a multitude of diſtinct conſcious beings; or its power of thinking muſt ariſe from the connection of the parts one with another, their motion and diſpoſition, &c. which, all taken together, contribute to the production of thought.

But it is evident, that the motion of parts, and the manner of combining them, can produce nothing but an artful ſtructure and various modes of motion. Hence, all machines, however artfully their parts are put together, and however complicated their ſtructure, though we conceive innumerable different motions, variouſly combined, and running one into another with an endleſs variety, yet never produce any thing but figure and motion. If a clock, or watch, tells the hour and minutes of the day, it is only by the motion of the different hands, pointing ſucceſſively at the different figures marked on the hour-plate for that purpoſe. We never imagine this to be the effect of thought or intelligence, nor conceive it poſſible, by any confinement of ſtructure, ſo to improve the compoſition as that it ſhall become capable of knowledge and conſciouſneſs; and the reaſon is plainly this, that thought being ſomething altogether different from motion and figure, without the leaſt connection between them, it can never be ſuppoſed to reſult from them.

This, then, being evident, that intelligence cannot ariſe from an union or combination of unintelligent parts; if we ſuppoſe it to belong to any ſyſtem of matter, we muſt neceſſarily attribute it to all the parts of which that ſyſtem is compoſed; whereby, inſtead of one, we ſhall, as was before obſerved, have a multitude of diſtinct conſcious beings. And becauſe matter, how far ſoever we purſue the minuteneſs of its parts, is ſtill capable of repeated diviſions, even to infinity, it is plain, that this abſurdity will follow us through all the ſuppoſitions that make thought inherent in a material ſubſtance. Wherefore, as conſciouſneſs is incompatible with the coheſion of ſolid ſeparable parts, we are neceſſarily

rily led to place it in ſome other ſubſtance, of diſtinct nature and properties; and this ſubſtance we call ſpirit, which is altogether diſtinct from body, nay, and commonly placed in oppoſition to it: for which reaſon, the beings of this claſs are called immaterial; a word that implies nothing of their true nature, but merely denotes its contrariety to that of matter.

As to the immortality of the human ſoul, the arguments to prove it may be reduced to the following heads: 1. The nature of the ſoul itſelf, its deſires, ſenſe of moral good and evil, gradual increaſe in knowledge and perfection, &c. 2. The moral attributes of God.

Under the former of theſe heads it is urged, that the ſoul, being an immaterial intelligent ſubſtance, as has been already proved, does not depend on the body for its exiſtence; and therefore may, nay, and muſt, exiſt after the diſſolution of the body, unleſs annihilated by the ſame power which gave it a being at firſt; which is not to be ſuppoſed, as there are no inſtances of annihilation in nature. This argument, eſpecially if the infinite capacity of the ſoul, its ſtrong deſire after immortality, its rational activity and advancement towards perfection, be likewiſe conſidered, will appear perfectly concluſive to men of a philoſophical turn; becauſe nature, or rather the God of nature, does nothing in vain.

But arguments drawn from the latter head, viz. the moral attributes of the Deity, are not only better adapted to convince men unacquainted with abſtract reaſoning, but equally certain and concluſive with the former: for as the juſtice of God can never ſuffer the wicked to eſcape unpuniſhed, nor the good to remain always unrewarded; therefore, arguments drawn from the manifeſt and conſtant proſperity of the wicked, and the frequent unhappineſs of good men in this life, muſt convince every thinking perſon, that there is a future ſtate wherein all will be ſet right, and God's attributes of wiſdom, juſtice, and goodneſs fully vindicated. We ſhall only add, that had the virtuous and conſcientious part of mankind no hopes of a future ſtate, they would be of all men moſt miſerable: but as this is abſolutely inconſiſtent with the moral character of the Deity, the certainty of ſuch a ſtate is clear to a demonſtration.

SOUND, *Sonus*, a ſimple perfection, or idea, communicated to the ſoul, by means of the ear, which is the primary organ of hearing. See the article EAR.

Sound is cauſed by an undulatory, or wave-like motion of the air, ariſing from the tremulous motion of the parts of any ſonorous body when ſtruck upon; for thoſe undulations, or pulſes of the air, beating on the tympanum or drum of the ear, convey by the auditory nerves the ſenſation of ſound to the mind. See the article HEARING.

For that ſound has a neceſſary dependence on the air, is proved by the experiment of the bell in an exhauſted receiver; and the parts of a ſonorous body being put into motion by percuſſion, excite concentric vibrations in the air all around the ſaid body; ſo that let a perſon be any how, or any where ſituated within the verge of thoſe motions, and he will equally hear the ſound, at equal diſtances from the body whence it comes.

SOUND, in muſic. The principal affection of ſound, whereby it becomes fitted to produce harmony, and raiſe agreeable ſenſations, is that whereby it is diſtinguiſhed into acute and grave; the cauſe of which appears to be no other than the different velocity of the vibrations of the ſounding body.

SOUND, in geography, denotes in general any ſtreight, or inlet, of the ſea, between two headlands. However, the name Sound is given, by way of eminence, to the ſtreight between Sweden and Denmark, joining the German ocean to the Baltic, being about four miles over.

SOUND-BOARD, in an organ, is a reſervoir into which the wind, drawn in by the bellows, is conducted by a port-vent, and hence diſtributed into the pipes placed over holes in its upper-part: this wind enters them by valves, which open by preſſing upon the ſtops or keys; after drawing the regiſters, which prevent the air from entering any of the pipes, except thoſe it is required in.

SOUNDING, in navigation, is the trying the depth of the water, and the quality of the bottom, either by an inch or three quarter rope, with a deep ſea-lead at the end of it. The ſounding line or rope, is marked at two, three, and four fathoms, with a piece of black leather betwixt the ſtrands; and, at five fathoms, with a piece of white leather, or cloth. The plummet, or lead, is uſually in the form of a nine-pin, and weighs eighteen pounds; and its lower end is frequently greaſed, to know whether the bottom is ſandy, rocky, &c. Near banks, ſhores, &c. they ſound continually.

SOUP, or SOOP, a kind of pottage made of bread and broth, or the juice of fleſh, or ſome other matters, uſually ſerved at the beginning of a meal.

Soup is eſteemed eſſential to a French dinner; ſometimes they heighten the reliſh by the addition of onions, or leeks, or cabbage, &c.

SOURIS, in the manege, is a cartilage in the noſtrils of a horſe, by means of which he ſnorts. See the article SNORT.

SOUTH, in coſmography, one of the four cardinal points. See the article COMPASS.

SOUTHERNWOOD, *Abrotanum*, in botany, a ſpecies of artemiſia. See ARTEMISIA.

The common ſouthernwood riſes to the height of three or four feet, having many hard brittle branches, which are full of a white pith, and of a brown

brown colour; these are furnished with many narrow leaves, which, when bruised, emit a strong odour, and have a bitterish taste: the flowers come out on the sides of the branches, and are like those of wormwood: it is easily propagated by slips or cuttings, planted in the spring, on a bed of light earth.

Southernwood is an attenuant, and is serviceable in all obstructions of the viscera, and in destroying worms; it is recommended in suppressions of urine, and against the gravel; also it is said to resist poisons, particularly from the bites of venemous creatures.

SOW, in zoology, the female of the hog-kind. See the article HOG.

Sow, in the iron-works, the name of the block or lump of metal they work at once in the iron-furnace. The size of these sows of iron is very different, even from the same workmen, and the same furnace. These furnaces having sand-stones for their hearths and sides up to the height of a yard, and the rest being made of brick, the hearth by the force of the fire is continually growing wider, so that if it at first contains as much metal as will make a sow of six or seven hundred weight, it will at last contain as much as will make a sow of two thousand weight.

SOW-BREAD, *Cyclamen*, in botany. See the article CYCLAMEN.

SOW-THISTLE, *Sonchus*, in botany. See the article SONCHUS.

SOWING, in husbandry, &c. See the article SEED, SEMINATION, &c.

One great article in sowing to advantage, Mr. Tull observes, is to know exactly at what depth the seed may be laid without danger of burying it. Seed is said to be buried, when it is laid at a depth below what it is able to come up at. Different sorts of seeds come up at different depths, some six inches and more, and others will not bear to be buried at more than half an inch. For coming at an accurate knowledge of the depth at which every seed will come up best from the sowing, Mr. Tull proposes to make gages; for the method of conducting which, we refer the reader to his own account of it, in page 58, of his Horse-hoeing Husbandry.

However, it is to be observed, that it is not proper to sow the seeds of all plants at the greatest depths at which they will come up; for it may be so deep as that the wet may rot or chill the first root, as is the case with wheat in moist land. The nature of the land, and the manner how it is laid, either flat or in ridges, and the season of sowing, with the experience of the husbandman, must determine the proper depths for different sorts of seed.

The quantity of seed is to be different also, according to the manner of the sowing. The proper quantity to be drilled on an acre is much less than must be sown in the common way, not because hoeing will not maintain as many plants as the other, for on the contrary, it will maintain many more; but the difference is upon many other accounts, as that it is impossible to sow it so even by hand as the drill will do. For let the hand spread it ever so exactly, which yet is difficult enough to do with some seeds in windy weather, yet the unevenness of the ground will alter the situation of the seeds, the greatest part of them rebounding into holes, and the lowest places; or else the harrows, in covering, drawing them down thither; so that these low places may have ten times too much seed, and the high places may have little or none of it; and this inequality lessens in effect the quantity of the seed, because fifty seeds in room of one, will not produce so much as one will do; and where they are too thick, they cannot be well nourished, their roots not spreading to near their natural extent, for want of hoeing, to open the earth and give them way.

The distance of the rows is one extremely material point in the obtaining a good crop; but as a much larger distance is to be allowed in these than common practice has been used to, it is very difficult to persuade the farmer to venture a trial at such distances as he may have experience from.

SOWNE, a term used in the exchequer, where estreats that sowne not, are such as the sheriff by his care and diligence cannot levy, wherefore they are not regarded; and the estreats that sowne, are such as he may levy.

SPACE, *Spatium*, is defined by Mr. Locke, to be a simple idea, which we attain both by our sight and touch. The modes whereof are distance, capacity, extension, duration. &c. See the articles DISTANCE, CAPACITY, &c.

Space considered barely in length, between two bodies, is the same idea which we have of distance. If it be considered in length, breadth, and thickness, it is properly called capacity; when considered between the extremities of matter which fills the capacity of space with something solid, tangible, and moveable, it is then called extension; so that extension is an idea belonging to a body, but space, it is plain, may be conceived without it. Each different distance is a different modification of space, and each idea of any different space is a simple mode of this idea: such are an inch, foot, yard, &c. which are the ideas of certain stated lengths, which men settle in their minds for the use, and by the custom of measuring. When these ideas are made familiar to mens thoughts, they can repeat them as often as they will, without joining to them the idea of body, and frame to themselves the ideas of feet, yards, or fathoms, beyond the utmost bounds of all bodies; and by adding these still one to another, enlarge their idea of space as much as they

they please. From this power of repeating any idea of distance without ever coming to an end, we come by the idea of immensity.

Another modification of space is taken from the relation of the termination of the parts of extension, or circumscribed space, amongst themselves; and this is what we call figure. This, the touch discovers in sensible bodies, whose extremities come within our reach; and the eye takes, both from bodies and colours, whose boundaries are within its view; where observing how the extremities terminate, either in streight lines, which meet at discernible angles; or in crooked ones, wherein no angles can be perceived: by considering these as they relate to one another in all parts of the extremities of any body or space, it has that idea we call figure, which affords to the mind infinite variety. See FIGURE.

Another mode belonging to this head is, that of place.

There is another mode of space, the idea of which we get from the fleeting and perpetually perishing parts of succession, which we call duration.

Space is usually divided into absolute and relative. Absolute space is that considered in its own nature, without regard to any thing external, which always remains the same, and is infinite and immoveable.

Relative space, is that moveable dimension, or measure of the former, which our senses define by its positions to bodies within it, and this is the vulgar use for immoveable space.

Relative space in magnitude and figure, is always the same with absolute; but it is not necessary it should be so numerically; as if you suppose a ship to be, indeed, in absolute rest, then the places of all things within her will be the same, absolutely and relatively, and nothing will change its place: but suppose the ship under sail or in motion, and she will continually pass through new parts of absolute space; but all things on board, considered relatively in respect to the ship, may be, notwithstanding, in the same places, or have the same situation and position in regard to one another.

Proper and absolute motion is defined to be the application of a body to different parts of absolute, that is, infinite and immoveable space. The Cartesians, who maintain extension the essence of matter, assert, that the space any body takes up is the same thing with the body itself; and that there is no such thing as mere space void of all matter in the universe.

SPACE, in geometry, denotes the area of any figure, or that which fills the interval or distance between the lines that terminate it.

SPACE, in mechanics, the line a moveable body, considered as a point, is conceived to describe by its motion.

SPADE, an instrument for digging up the ground, the handle or shaft whereof is about three feet long; the head is all of iron; the upper part being flat for the workman to set his foot on, to force it into the ground; the length of the head is about a foot or fifteen inches, and the breadth six or eight.

SPAGIRIC ART, *Ars Spagirica*, a name given by authors to that species of chemistry which works on the metals, and is employed in the search of the philosopher's stone.

SPAN, a measure taken from the space between the thumb's end and the tip of the little finger, when both are stretched out. The span is estimated at three hands breadth, or nine inches.

SPANIEL, in zoology, a species of the canis, or dog-kind. See the article CANIS.

There are two sorts of spaniels which necessarily serve for fowling: the first of these finds game on land, and the other on the water. Such spaniels as play their parts by land, do it either by swiftness of foot, by springing the bird, or by discovering to the fowler, by some secret sign, the place where the game lights; they serve the hawk and the net, or train.

The water-spaniel, partly by natural inclination, and partly by being well trained, has recourse to the water for his game, and by this means most of the water-fowl are taken. The size of this spaniel is somewhat larger than the other, but he is generally remarkable for long rough curling hair, which must be clipped at proper times, to render him more light for swimming.

SPAR, in natural history, a class of fossils, not inflammable nor soluble in water; when pure, pellucid and colourless, and emulating the appearance of crystal, but wanting its distinguishing characters; composed of plane and equable plates, not flexile nor elastic; nor giving fire with steel; readily calcining in a small fire, and fermenting violently with acids, and wholly soluble in them.

The spars, in general, are found in the fissure of stones, and about mines. Derbyshire affords enough of them to supply the whole world; and the German mines afford yet larger quantities.

If crystal be subject to a vast variety of appearances, so as to constitute different orders and genera, spar is much more so, there being no less than ten orders of it.

1. The pellucid, crystalliform, and perfect spars, composed of a column terminated at each end by a pyramid. 2. Those composed of two pyramids joined base to base, without any intermediate column. 3. The crystalliform columnar spars, adhering by one end to some solid body, and terminated at the other by a pyramid. 4. The pyramidal crystalliform spars without columns. 5. The spars of a parallelopiped form. 6. The spars externally of no regular form, but breaking into rhomboidal

maſſes. 7. The cruſtaceous ſpars; theſe are of a cryſtallino-terrene ſtructure, or debaſed from their native pellucidity by an admixture of earth, and formed into plates or cruſts of a ſtriated figure within. 8. The cruſtaceous terrene ſpars; bodies ſo highly debaſed with earth, as to appear merely earthy, of an irregular ſtructure, and not ſtriated within: theſe often encruſt fiſſures of ſtone, and ſometimes vegetable and other extraneous bodies in ſprings. 9. The ſpars formed into oblong cylindric bodies, known by the name of ſtalactitæ, or ſtony icicles. 10. The ſpars formed into ſmall round figures compoſed of various cruſts incloſing one another, and generally known by the name ſtalagmitæ: and adding to theſe the ſpars, influenced in their figures by metalline particles, we have the whole ſeries of theſe bodies, viz. 1. The cubic ſpars, owing their figure to lead. 2. The pyramidal ſpars with four planes, owing their figure to tin. 3. The rhomboidal ſpars, conſiſting of ſix planes, owing their figure to iron.

For medicinal uſe, the pureſt and moſt pellucid ſpars ſhould be choſen: theſe perfectly diſſolve in acids, and are recommended in nephritic caſes. Some have uſed one kind, ſome another, as the lapis judaicus, the ſparry incruſtations of caverns, petrified oyſter-ſhells, and water in which large quantities of ſpar are ſuſtained. After all, the nephritic virtues of ſpar want ſufficient proof; ſome even ſuſpect its uſe to be more hurtful than beneficial.

It were to be wiſhed, that whoever attempts to aſcertain this point, would chooſe for the experiment ſome determinate kind of ſpar in its natural form, rather than under appearances, whereby its efficacy may be confounded with that of other bodies.

SPARAGUS, in botany. See the article ASPARAGUS.

SPARGANIUM, bur-reed, in botany, a genus producing male and female flowers on different plants; they have no corolla, and are diſpoſed in a roundiſh amentum; the cup is formed of three linear deciduous leaves; and the fruit is a dry drupe, turbinated with a point, and angulated underneath: the ſeeds are two oſſeous, oblongo-ovated, and angulated nuts.

The root of this plant is recommended by Diaſcorides as excellent againſt the poiſon of ſerpents, when taken in wine.

SPARROW, *Paſſer*, in ornithology, a ſpecies of the fringilla.

The common ſparrow is the brown fringilla, with a black throat and brown temples. It is larger than the linnet, and the male is an erect and handſome bird; the head is large, the eyes ſmall, and the beak ſhort; the wings are ſhort, and the tail ſhort and forked.

The reed-ſparrow, or the frangilla with a black head, brown at the ſides, and with a white ring round the neck, and a mottled back and white breaſt, is a very beautiful and ſingular bird, of the ſize of the common linnet; the head is ſmall and depreſſed, the beak ſhort and black, and the eyes hazle; and in moſt other particulars it correſponds with the common ſparrow.

SPARROW-HAWK, in ornithology, the yellow-legged falcon, with a white undulated breaſt, and a faſciated brown tail.

This bird is about the bigneſs of a pigeon, but conſiderably longer bodied, in proportion to its thickneſs; its wings when expanded, meaſure twice the length of the body and tail; the tail is ſhort but very ſtrong, thick at the baſe, very ſharp at the point and conſiderably hooked; the head is ſmall, ſomewhat flatted, and of a browniſh colour; the eyes are as it were ſunk in the head, and their iris is yellow and bright.

SPARROW-WORT, *Paſſerina*, in botany. See the article PASSERINA.

SPARSED LEAVES, among botaniſts, are thoſe which are placed irregularly about the ſeveral parts of a plant.

SPARTIUM, the broom-tree, in botany, a genus of plants, whoſe flower is pentapetalous and papilionaceous; the vexillum of which is large, almoſt heart-ſhaped, and totally reflexed; the alæ are ovate, oblong, and ſhorter than the vexillum; and the carina is dipetalous, lanceolated, oblong, and larger than the wings: the fruit is a long, cylindric, obtuſe pod, with one cell and two valves, which include a number of round kidney-ſhaped ſeeds.

SPARTIUM, is alſo Tournefort's name for the geniſta of Linnæus, as is geniſta Linnæus's name for Tournefort's ſpartium. See the article GENISTA.

SPASM, *Spaſma*, or *Spaſmus*, in medicine. See CONVULSION.

A ſpaſm, according to Hoffman, may be univerſal or particular, ſalutary or morbous. An univerſal ſpaſm happens if the whole vaſcular genus, chiefly the heart and arteries, as alſo the fibres of the ſyſtem, are affected, and there is a preternatural conſtriction therein, whereby the ſyſtole and diaſtole are increaſed, and the progreſs of the blood accelerated; this conſtitutes a fever, whereof a frequent pulſe is the moſt certain ſign.

The other kind of ſpaſms is particular, and affects only one part of the body, which it conſtringes, and interceps the free progreſs of the blood, rendering it unequal, and ſending it in greater plenty to the other parts of the body. But particularly, this ſpaſtic affection affects the nervous and membranous parts, ſuch as the ſtomach, and the whole volume of inteſtines; whence proceed the hyſteric and hypochondriac paſſions. A ſpaſm is likewiſe preſent in hæmorrhages, congeſtions of the blood, and unequal

equal flux of the fluid in all anxieties and ſuppreſſed excretions. See the articles HYPOCHONDRIAC, HYSTERIC, HÆMORRHAGE, &c.

If a violent ſpaſm happens to affect the dura mater, an epilepſy or univerſal convulſion follows; and convulſive motions of the membranes and nerves have their origin from the medulla ſpinalis. A ſpaſm is ſalutary when it deſtroys the cauſe of the diſeaſe, by taking away the ſtagnation of the humours, correcting acid cauſtics, and promoting the excretion of the morbid matter; but it is very pernicious when it conſtringes the ſkin and all the excretory veſſels, detaining the morbous matter therein, and forcing it upon the vital parts. The cauſes and treatment of ſpaſms in general, have already been treated of under the articles CONVULSION and CONVULSIVE DISORDERS.

In a ſpaſm of the lower jaw, when the patient can neither open his mouth nor eat, as when perſons are wounded, and ſomething foreign is lodged therein, or when the nerves are hurt, or when ſharp things, ſuch as vitriol, are applied to ſtop the blood, the cure muſt be performed according to the diverſity of the cauſes, as particularly treated of in ſurgery; but when this happens ſpontaneouſly in infants, it is obſerved that they generally die, though the beſt nervous and antiſpaſmodic medicines be uſed.

In the cynic ſpaſm, or, as it is otherwiſe called, the ſardonian laughter, if it proceeds from poiſons, as it generally does (eſpecially hemlock or oenanthe) Heiſter directs that they be expelled immediately from the body by a vomit; then giving generous wines, warm with ginger or pepper, as was the practice of the ancients. If it happens from other cauſes, it muſt be treated with antiſpaſmodics and nervous medicines, both inwardly and outwardly, and chiefly with plaſter of betony and bayberries prepared with oil of amber, and applied to the temples and behind the ears.

SPASMODIC, ſomething belonging to a ſpaſm or convulſion. See the preceding article.

SPATHA, among botaniſts, a kind of flower-cup, which conſiſts of a membranaceous matter growing to the ſtalks of ſome certain flowers.

This kind of cup is of various figures, often diphyllous, or divided into two parts; ſometimes ſimple, and with others more divided: it incloſes ſometimes a ſingle flower, ſometimes ſeveral flowers together, and theſe have often no perianthium. The ſpatha is of very different texture and conſiſtence in different plants. From a ſpatha, or ſheath, proceed the flowers of the narciſſus, galanthus, pancratium, arum, calla, palm. &c.

Some authors, by this word, expreſs a rib; others, the chirurgical inſtrument called ſpatula; others, a ſort of inciſion-knife, and by others it is taken for a ſword, this laſt being, indeed, its proper ſignification, and all the reſt being only metaphorical applications of it to different things, which bear ſome reſemblance to a ſword.

SPATHELIA, in botany, a genus of plants, whoſe flower conſiſts of five oblong equal petals, with five ſubulated filaments topped with ovate antheræ; the fruit is an oblong trigonal capſule, having three cells, each containing an oblong triquetrous ſeed.

SPAVIN, in the manege, a diſeaſe in horſes, being a ſwelling or ſtiffneſs uſually in the ham, occaſioning a lameneſs. There are two kinds of ſpavins, viz. the ox-ſpavin, which is a callous tumour at the bottom of the ham on the inſide, hard as a bone, and very painful; while it is yet recent, ſome only hault with it at firſt coming out of the ſtable: the other, which is the dry ſpavin, is more eaſily perceived by the horſe's raiſing one of his hind legs with a twitch higher than the other; but ſometimes it is found on both legs. This kind, which ſome alſo call ſtringhalt, frequently degenerates into the ox ſpavin, for which there is no remedy but to apply the fire, and even this is not always ſucceſsful.

There are two other kinds of ſpavin which have their ſeat in the hoof, viz. the blood-ſpavin, being a ſoft tumour which grows through the horſe's hoof, and is uſually full of blood; the other is the bone-ſpavin, being a cruſty ſubſtance growing on the inſide of the hoof under the joint.

SPAYING, or SPADING, the operation of caſtrating the females of ſeveral kinds of animals, as ſows, bitches, &c. to prevent any further conception, and promote their fattening.

It is performed by cutting them in the mid flank, on the left-ſide, with a ſharp knife or lancet, taking out the uterus and cutting it off, and ſo ſtitching up the wound, anointing the part with tar, and keeping the animal warm for two or three days. The uſual way is to make the inciſion aſlope two inches and a half long, that the fore-finger may be put in towards the back to feel for the ovaries, which are two kernels as big as acorns on both ſides of the uterus, one of which is drawn to the wound, the ſtring thereof cut, and thus both taken out.

SPEAKER *of the Houſe of Commons*, a member of the houſe elected by a majority of the votes thereof, to act as chairman or preſident in putting queſtions, reading briefs or bills, keeping order, reprimanding the refractory, adjourning the houſe, &c. The firſt thing done by the commons, upon the firſt meeting of a parliament, is to chuſe a ſpeaker, who is to be approved of by the king, and who, upon his admiſſion, begs his majeſty that the commons, during their ſitting, may have free acceſs to his majeſty, freedom of ſpeech in their own houſe, and ſecurity from arreſts. The ſpeaker

is not allowed to perſuade or diſſuade in paſſing a bill, but only to make a ſhort and plain narrative; nor to vote unleſs the houſe be equally divided. See PARLIAMENT.

The lord chancellor or keeper is uſually ſpeaker of the houſe of lords; the ſpeaker of the convocation is called the prolocutor. See the article PROLOCUTOR.

SPEAKING, the art or act of expreſſing one's thoughts in articulate ſounds or words.

SPECIALITY, is uſed for a bond, bill, or other deed or inſtrument executed under the hand and ſeal of the parties thereto.

SPECIES, in logic, a relative term, expreſſing an idea which is comprized under ſome general one, called a genus.

The idea of a ſpecies is formed, by adding a new idea to the genus: thus if the genus be a circumſcribed ſpace, and we ſuppoſe this circumſcription to be by lines, we ſhall obtain the notion of that ſpecies of figures which are called plane figures; but if we conceive the circumſcription to be by ſurfaces, we get an idea of the ſpecies of ſolid figures. This ſuperadded idea is called the ſpecific difference, not only as it ſerves to diſtinguiſh the ſpecies from the genus; but becauſe being different in all the ſeveral ſubdiviſions, we thereby alſo diſtinguiſh the ſpecies one from another: and as this ſuperadded conception completes the notion of the ſpecies, it is plain that the genus and ſpecific difference are the proper and conſtituent parts of the ſpecies.

If we trace the progreſs of the mind ſtill farther, and obſerve it advancing through the inferior ſpecies, we ſhall find its manner of proceeding to be always the ſame; ſince every lower ſpecies is formed, by ſuperadding ſome new idea to the ſpecies next above: thus, if animal be the genus, by ſuperadding the notion of four limbs, we obtain the idea of quadrupeds; if, to this, we add farther, the peculiar form and characters which diſtinguiſh mankind, we get the idea of the human ſpecies; and by adding the peculiarities which diſtinguiſh a particular perſon from all others, we form the notion of an individual, which is called the laſt ſpecies, or ſpecies ſpecialiſſimum. See DEFINITION.

SPECIES, in logic, is one of the five words called by Porphyry, univerſals.

SPECIES, in rhetoric, is a particular thing, contained under a more univerſal one.

SPECIES, in optics, the image painted on the retina, by the rays of light reflected from the ſeveral points of the ſurface of an object.

SPECIES, in commerce, are the ſeveral pieces of gold, ſilver, copper, &c. which, having paſſed their full preparation and coinage, are current in public. See the article COIN.

SPECIES, in algebra, the characters or ſymbols made uſe of to repreſent quantities. See the article CHARACTER.

SPECIES, in pharmacy, denotes the ingredients of a compound medicine, as the diaſcordium in a dry form, or only reduced to powder. See DIASCORDIUM.

The ſpecies aromaticæ, according to the Edinburgh Diſpenſatory, conſiſt of equal parts of canella, leſſer cardamom-ſeeds, mace and ginger, reduced to powder: but the college of phyſicians, London, order them to be made of cinnamon two ounces; and leſſer cardamom-ſeeds huſked, ginger and long pepper, of each one ounce, all beat together into a powder. Both theſe compoſitions are agreeable, hot, ſpicy medicines; and as ſuch may be uſefully exhibited in cold phlegmatic habits and decayed conſtitutions, for warming the ſtomach, promoting digeſtion, and ſtrengthening the tone of the viſcera in general. The doſe is from ten grains to a ſcruple and upwards.

Change of SPECIES, in huſbandry, is the ſowing firſt one kind of plant, then another, and then a third, and ſo on, upon the ſame land; by this means the moſt is made of the ſoil; and it is found, when it will no longer give a good crop of the firſt corn planted on it, that it will ſtill give a good one of ſome other ſpecies; and, finally, of peaſe after all. After this laſt change of ſpecies, it is found neceſſary, in the common method of huſbandry, to renew the land with fallowing and manure, in order to its producing any thing again.

SPECIFIC, in philoſophy, that which is peculiar to any thing, and diſtinguiſhes it from all others.

SPECIFIC, in medicine, a remedy whoſe virtue and effect is peculiarly adapted to ſome certain diſeaſe, is adequate thereto, and exerts its whole force immediately thereon.

The illuſtrious Hoffman has given a curious account of ſpecific medicines, but it is too long to be inſerted here.

SPECIFIC GRAVITY, is that by which one body is heavier than another of the ſame dimenſion, and is always as the quantity of matter under that dimenſion. See the article GRAVITY.

As to the method of finding the ſpecific gravities of bodies, ſee HYDROMETER and HYDROSTATICAL-BALLANCE.

SPECIOUS-ARITHMETIC, the ſame with algebra. See the article ALGEBRA.

SPECTACLES, in dioptrics, a machine conſiſting of two lenſes, ſet in ſilver, horn, &c. to aſſiſt the defects of the organ of ſight. See LENS.

SPECTRE-SHELL, *Concha Spectrorum*, a ſpecies of voluta, variegated with ſeveral reddiſh faſciæ or bands. See the article VOLUTA.

SPECULARIS-LAPIS, in natural hiſtory, a genus of talcs, compoſed of large plates viſibly ſeparate, and of extreme thinneſs; and each fiſſile again ſeparated into a number of plates ſtill finer. See TALC.

SPE-

SPECULATIVE, ſomething relating to the theory of ſome art or ſcience, in contradiſtinction to practical. See the article THEORY.

SPECULUM, a looking glaſs, or mirrour, capable of reflecting the rays of the ſun, &c. See the article MIRROUR.

SPECULUM, in ſurgery, an inſtrument for dilating a wound, or the like, in order to examine it attentively.

SPEECH, in general, the art or act of expreſſing a perſon's thoughts, by means of articulate ſounds, which we call words. See the article WORD.

SPEEDWELL, *Veronica*, in botany. See the article VERONICA.

SPELL, in general, denotes the ſame with charm or amulet. See the articles CHARM and AMULET.

In the ſea-language, the word ſpell ſignifies to do any work for a ſhort time, and then leave it; therefore a freſh ſpell, is when freſh men come to work; and to give a ſpell, is to work in another's room.

SPELLING, in grammar, that part of orthography which teaches the true manner of reſolving words into their ſyllables. See the article ORTHOGRAPHY.

All words are either ſimple or compound, as *uſe*, *diſuſe*; *done*, *undone*: and the rules for dividing each, muſt be ſuch as are derived from the analogy of language in general, or from the eſtabliſhed cuſtom of ſpeaking; which, for the Engliſh language, are reduced to the following rules: 1. A conſonant between two vowels muſt be joined with the latter in ſpelling, as *na-ture*, *ve-ri-ly*, *gene-rous*: except, however, the letter *x*, wich is joined to the firſt, as in *flax-en*, *ox-en*, &c. and compound words, as in *up on*, *un-uſed*, &c. 2. A double conſonant muſt be divided, as in *let-ter*, *man-ner*, &c. 3. Thoſe conſonants which can begin a word, muſt not be parted in ſpelling, as in *de-fraud*, *reprove*, *di-ſtinct*: however, this rule is found ſometimes to fail; for though *gn* begins a word, as *gnaw*, *gnat*, &c. yet it muſt be divided in ſpelling, as in *cog-ni-zance*, *ma-lig-ni-ty*, &c. 4. Thoſe conſonants which cannot begin a word muſt be divided, as *ld* in *ſel-dom*, *lt*, in *mul-ti-tude*, *mp* in *tem-per*, *rd* in *ar-dent*; but, in final ſyllables, there are exceptions, as *tl* in *ti-tle*, *dl* in *han-dle*, &c. 5. When two vowels come together, and are both of them diſtinctly ſounded, they muſt be ſeparated in ſpelling, as in *co-e-val*, *mu-tu-al*, &c. 6. The grammatical terminations, or endings, muſt be ſeparated in ſpelling, as *ed* in *wing-ed*, *eſt* in *de-li-ver eſt*, *ing* in *hear-ing*, *ance* in *de-li-ver ance*, &c. 7. Compound words muſt be reſolved into their ſimple or component words, as *up-on*, *in-to*, *ne-ver-the leſs*, *not-with-ſtand-ing*, &c.

SPELTER, in natural hiſtory, the ſame with zinc. See the article ZINC.

SPENT, in the ſea language, ſignifies the ſame as broken.

SPERGULA, SPURRY, in botany, a genus of plants, whoſe flower conſiſts of five ovate, concave, patent petals; with ten ſubulated filaments, ſhorter than the petals, and topped with roundiſh antheræ; the fruit is an ovate, cloſe, unilocular capſule, opening with five valves, and containing many depreſſed globular ſeeds, ſurrounded with an emarginated border.

SPERMA-CETI, in pharmacy, a white flaky ſubſtance, prepared from the oil of a ſpecies of whale, called by ichthyologiſts, catodon, by reaſon it has teeth only in the under jaw. See CATODON.

The ignorance of the people who firſt uſed this medicine, gave it a name which ſeemed to expreſs its being the ſemen of the whale; but it is, in reality, no more than a preparation of the oil, with which that fiſh abounds.

Sperma-ceti is a fine, bright, white, and ſemipellucid ſubſtance, compoſed of a fine furfuraceous ſubſtance, formed into oblong flakes, very light, ſoft, and unctuous to the touch, inflammable, ſoluble in oil, but not in watery menſtrua; of ſcarce any ſmell, when freſh, and fine, and of a ſoft, agreeable, and unctuous taſte. The largeſt, firmeſt, and whiteſt flakes of it are to be choſen. It is liable to become rancid and yellowiſh in keeping, and the ſmaller fragments contract this bad quality ſooner than the larger.

The ſperma-ceti of the ſhops was firſt made from the head of this fiſh; the oil obtained from its brain, and the diploe of the cranium, furniſhing all that we had of it; and hence the conſiderable price it was long kept at. It was ſome time after found out, however, that any whale-oil would do as well as this, which occaſioned the price to fall conſiderably. At preſent it is made in England from whale-oil of any kind, the ſettlings of our oilmen's larger veſſels particularly, which are boiled with a lixivium of German pot-aſh, or pearl-aſhes, till white and firm; and after ſeveral other meltings, and a thorough ſeparation of what ſaline particles might have got into the matter, it is, when cold, cut out with knives into the flakes we ſee it in. The proceſs is eaſy, but it requires care, and a nice inſpection towards the end: if not enough boiled, it is apt to turn yellow, and ſoon grow rancid.

Sperma-ceti is, therefore, oil of the animal-kind, rendered very ſweet, and fit for internal uſe. Its virtues are emollient and pectoral; it is good in coughs and other diſorders of the breaſt; and excellent in external applications, ſuch as liniments, and the like: it readily diſſolves in oil, or other fatty ſubſtances, for the latter purpoſes; and, for the former, it blends with the yolk of an egg, and after that mixture with an aqueous fluid, and makes a pleaſant emulſion.

SPERMACOCE, BUTTON-WEED, in botany, a genus of plants, whoſe flower is monopetalous

and funnel-ſhaped, the tube is cylindric, narrow, and longer than the cup, and the limb is divided into four obtuſe, ſpreading, and reflexed ſegments; the ſtamina are four ſubulated filaments, topped with ſingle antheræ, and the fruit conſiſts of two oblong capſules growing together, gibbous on one ſide, and flat on the other, each having two horns or points; the ſeeds are ſingle and roundiſh. This genus being natives of Jamaica, require a ſtove for their preſervation in this climate.

SPERMATIC, in anatomy, ſomething belonging to the ſperm or ſeed.

SPERMATOCELE, in medicine and ſurgery, the ſame with the cirſocele, or hernia varicoſa. See the article CIRSOCELE.

SPHACELUS, in ſurgery and medicine, an abſolute and perfect corruption or death of the parts; whereby it is diſtinguiſhed from a gangrene, which is that very great and dangerous degree of inflammation, wherein the parts affected begin to corrupt and put on a ſtate of putrefaction. See GANGRENE.

In caſes of a perfect ſphacelus, or mortification, wherein the parts are become abſolutely dead, and wholly without ſenſe, and ſoft ſo as to retain the impreſſions of one's finger-end, and are plainly fetid and corrupted, all the medicines in the world will be inſufficient to reſtore the parts to life again; and all that remains to be done, is the one miſerable remedy of preſerving the reſt of the body, by cutting off that part, to prevent the mortification from ſpreading farther. A different method, however, is to be taken in this operation, according to the degree of the ſymptoms and the parts affected. If only ſome extremity of the foot, tarſus, metatarſus, ancle, or inſtep, or only the bare ſkin and fat are ſphacelated, the whole foot, in that caſe, ought not to be amputated, but preſerving the limb entire, the ſurgeon is only to remove that part which is vitiated: and Heiſter's opinion is, that this is frequently beſt of all done by ſuppuration; or elſe by cauſtic medicines. When it is to be done by ſuppuration, that is to be brought on as faſt as poſſible: and when it is done, the cruſt, or eſchar, of the ulcer, is to be ſuppurated from the ſound parts with proper caution. To haſten effectually a ſuppuration in theſe caſes, nothing is ſo ſerviceable as the making numerous long and deep ſcarifications near the ſound parts; and afterwards the inciſed parts are to be well anointed with the common digeſtive ointment, and after that treated with the balſamic cataplaſms and fomentations, in common uſe on the like occaſions. A fomentation alſo ſerviceable in theſe caſes, is made by mixing, in a quart of a decoction of ſcordium, or of barley-water, vinegar of rue, ſix ounces; ſpirit of wine with Venice-treacle, four ounces; and an ounce or two ounces of common ſalt; this is to be applied hot, with compreſſes to the inciſed part, and frequently repeated till the diſorder appears to ſpread no farther, which is known to be the caſe, when the tumour of the vitiated part ſubſides, and the edges of the ſound part become tumid all round; and the ſecond or third day after this, a ſuppuration is uſually formed, and the ſound parts become gradually ſeparated from the vitiated. After this, to ſoften and promote a ſpeedy ſeparation of the eſchar, the following cataplaſm is always found highly ſerviceable: take of ſcordium, two handfuls; mallows, marſh-mallows, and henbane, of each one handful; lavender flowers half an handful: let theſe be boiled to the conſiſtence of a cataplaſm in vinegar or oxycrate; and when in that ſtate, add to them three ounces of the flower of linſeed, one ounce of linſeed oil, and two ounces of ſal armoniac. This is to be applied warm over the whole, and is to be retained in that condition, as long as ſhall be found neceſſary, by means of a brick boiled in water, and applied wrapped in a linen-cloth, or ſome other like means. See SUPPURATION and FOMENTATION.

After theſe medicines have been uſed, and the whole ſurrounding ſkin is gently tumefied with redneſs, a cruſt or eſchar is then formed by degrees, and the ſound fleſh begins to ſeparate from the reſt; by this we know that the diſorder has done ſpreading, and that an entire ſuppuration of the vitiated parts will very ſhortly follow. When this ſeparation ſhews itſelf beginning, it ſhould be promoted as much as poſſible, by dreſſing the part with the common digeſtive, either alone, or mixed with Venice-treacle, which muſt be retained on between the ſound and the dead parts. To make way for this, it is ſometimes neceſſary to divide them a little by the lancet; and when that is done, and the dreſſing has been applied, the before-deſcribed cataplaſm ſhould be laid on warm; and in all the ſucceeding dreſſings, whatever is found looſe of the dead part muſt be carefully removed. And if it be neceſſary, from the adheſion of the vitiated parts to the ſound, to uſe the ſciſſars, or ſcalpel, to divide them, this is always to be done with very little either of pain or danger; it will then be proper to dreſs the part with the digeſtive, and a plaſter of diachylon, or the like, over it, till the corrupted parts are entirely caſt off, and the ulcer appears perfectly well cleanſed, and the cure is then eaſily perfected in the common way.

SPHÆRANTHUS, globe-flower, in botany, a genus of plants, whoſe flower is compoſed of female and hermaphrodite corollulæ, included in a globoſe imbricated cup; the hermaphrodite florets are barren and placed in the diſc; they are monopetalous and funnel-ſhaped; the female florets are placed round the border, and are tubulated, with the mouth cut into three ſmall ſegments; there is no pericarpium, but the cup contains the ſeeds, which are oblong, naked, and placed on a ſquamous receptacle.

SPHÆROCARPUS, in botany, a genus of the cryptogamia claſs of plants, conſiſting of foliaceous matter, expanded on the ground, and producing very large and obvious fructifications.

Dr. Hill thinks it probable, that the male flowers are produced on ſeparate plants from the female, and have not been diſcovered to belong to the ſame ſpecies: no male parts of fructification are deſcribed to us; the female parts conſiſt of a tubulated and inflated vagina, within which are contained a large glubular capſule, containing a great number of ſmall looſe ſeeds.

SPHÆROMACHIA, *σφαιρομαχια*, in antiquity, a particular kind of boxing, wherein the combitants had balls of ſtone, or lead, in their hands, which were called *σφαιραι*; hence the ſeventh part of the gymnaſium, where this exerciſe was practiſed, was called the ſphæriſterium.

SPHAGNUM, in botany, a genus of moſſes, conſiſting of ſtalks furniſhed with leaves; there is neither calyptra or corolla, but a ſmall membrane runs into the anthera and receptacle; the anthera is globoſe, with its mouth intire, and the receptacle is marginated, obſolete, and under the anthera.

SPHENOIDAL SUTURE, in anatomy, a ſuture thus called from its encompaſſing the os ſphenoides, which it ſeparates from the os frontis, the os petroſum, and the os occipitis. See SKULL, and the next article.

SPENOIDES, or OS CRUCIFORME, in anatomy, the ſeventh bone of the cranium, or ſkull.

SPHENOPHARYNGÆUS, in anatomy, a pair of muſcles, called alſo the pterygopharingæus. See PTERYGOIDÆUS.

SPHENOSTAPHYLINUS, in anatomy, a muſcle of the larynx. It deſcends from a round fleſhy origination, near the root of a proceſs of the os ſphenoides, and from thence runs obliquely to the uvula, and is inſerted into its hinder and upper part, where it joins its partner.

It ſerves to draw the uvula upwards and backwards, and hinders the maſticated aliment from paſſing into the foramina narium, in deglutition.

SPHERE, *Sphæra*, *σφαιρα*, is a ſolid contained under one uniform round ſurface, ſuch as would be formed by the revolution of a circle, about a diameter thereof, as an axis.

Properties of the SPHERE. 1. All ſpheres are to one another as the cubes of their diameters. 2. The ſurface of a ſphere is equal to four times the area of one of its great circles, as is demonſtrated by Archimedes in his book Of the Sphere and cylinder, lib. i. prop. 37. hence, to find the ſuperficies of any ſphere, we have this eaſy rule; let the area of a great circle be multiplied by 4, and the product will be the ſuperficies: or, according to Euclid, lib. vi. prop. 20. and lib xii. prop. 2. the area of a given ſphere, is equal to that of a circle, whoſe radius is equal to the diameter of the ſphere. Therefore, having meaſured the circle deſcribed with the radius, this will give the ſurface of the ſphere. 3. The ſolidity of a ſphere is equal to the ſurface multiplied into one third of the radius: or, a ſphere is equal to two thirds of its circumſcribing cylinder, having its baſe equal to a great circle of the ſphere.

SPHERE, in aſtronomy, that concave orb, or expanſe, which inveſts our globe, and in which the heavenly bodies appear to be fixed, and at an equal diſtance from the eye.

The better to determine the places of the heavenly bodies in the ſphere, ſeveral circles are ſuppoſed to be deſcribed on the ſurface thereof, hence called the circles of the ſphere: of theſe, ſome are called great circles, as the equinoctial, ecliptic, meridian, &c. and others, ſmall circles, as the tropics, parallels, &c. See each under its proper article.

Armillary SPHERE. See the article ARMILLARY SPHERE.

SPHERE *of Activity of a Body*, is that determinate ſpace or extent, to which, and no farther, the effluvia continually emited from that body, reach; and where they operate according to their nature. See the article POWER.

SPHERICS, is that part of geometry which treats of the poſition and menſuration of arches of circles, deſcribed on the ſurface of a ſphere.

SPHEROID, in geometry, a ſolid, approaching to the figure of a ſphere.

The ſpheroid is generated by the entire revolution of a ſemi-ellipſis about its axis. See the article ELLIPSIS.

SPHINCTER, in anatomy, a term applied to a kind of circular muſcles, or muſcles in form of rings, which ſerve to cloſe and draw up ſeveral orifices of the body, and prevent the excretion of the contents: thus the ſphincter of the anus cloſes the extremity of the inteſtinum rectum.

The ſphincter of the bladder is compoſed of a ſeries of tranſverſe fibres running croſswiſe, under the ſtrait fibres of the neck of the bladder, in form of a circle, and ſerving to cloſe it, to prevent the involuntary diſcharge of the urine.

The ſphincter of the pupil of the eye appears upon the poſterior ſurface of the uvea when its blackneſs is cleared away, and is formed of circular fibres for contraction, as the ciliary fibres are for the dilatation of the pupil.

The ſphincter of the vagina is compoſed of a ſeries of muſcular fibres ariſing from the ſphincter of the anus, and ſurrounds the orifice of the vagina.

SPHINX, *σφιγξ*, in ſculpture, *&c.* a figure or repreſentation of a monſter of that name, famed among the antients, now moſtly uſed as an ornament in gardens, terraces, *&c.* It is repreſented with the head and breaſts of a woman, the wings of a bird, the claws of a lion, and the reſt of the body like a dog. It is ſuppoſed to have been engendered

gendered by Typhon, and ſent by Juno to be revenged on the Thebans. Its office, they ſay, was to propoſe dark enigmatical queſtions to all paſſers by; and if they did not give the explication thereof, to devour them. It made horrible ravages, as the ſtory goes, on a mountain near Thebes, and could not by any means be deſtroyed, till after Œdipus had ſolved the following riddle, "What animal is it that in the morning walks on four legs, at noon on two, and at night on three?" The anſwer was "Man."

Among the Egyptians, the ſphinx was the ſymbol of religion, by reaſon of the obſcurity of its myſteries: and on the ſame account the Romans placed a ſphinx in the porch of their temples.

SPICA VIRGINIS, a ſtar of the firſt magnitude, in the conſtellation virgo. See VIRGO.

SPIDER, *aranea*, in zoology, an inſect of a roundiſh or ellipt c figure, having eight eyes placed on the hinder part of the thorax, and having alſo eight legs. This creature has a power of ſpinning.

The ſpecies of ſpiders are very numerous; but authors have made them more ſo, by admitting among them other inſects of a very different genera.

SPIDER-WORT, *phalangium*, in botany, a genus of plants whoſe flower conſiſts of ſix oblong, blunt, ſpreading petals; and ſix ſubulated erect filaments, topped with ſmall incumbent furrowed antheræ.

The fruit is a ſmooth, ovate, three furrowed capſule, containing a number of angulated ſeeds.

This genus is comprehended among the antericums by Linnæus.

Virginia SPIDER-WORT. See the article TRADESCANTIA.

SPIEL, in the glaſs-trade, an iron-inſtrument, hooked at the end and pointed, with which the workmen take the metal up out of the melting-pots, for proofs or eſſays, to ſee whether it be fit for work.

SPIGELIA, worm-graſs, in botany, a genus of plants whoſe flower is monopetalous and funnel-ſhaped. The tube is much longer than the cup; and is narrower below than above: and the limb is quinquefid and ſpreading. The ſtamina are five in number; and the fruit conſiſts of two globoſe capſules, which join together, and are placed on the cup. The ſeeds are roundiſh, very ſmall and numerous.

This genus are natives of North America, and is much eſteemed there for its efficacy in deſtroying worms, for which purpoſe it has been long uſed by the inhabitants of Braſil, and alſo by the negroes, who taught the inhabitants of the Britiſh iſlands in America the uſe of it.

SPIGNEL, *meum*, in botany, a genus of umbelliferous plants, the general corolla of which is uniform. The partial one conſiſts of five inflexo-cordated, unequal petals. There is no pericarpium. The fruit is oblong, ſtriated, and diviſible in two parts. The ſeeds are two; oval, ſtriated, convex on one ſide, and plane on the other.

This genus is called athamanta by Linnæus.

The root of ſpignal is uſed in medicine. It is about the thickneſs of the little finger, branched, and cover d with a bark of a ferruginous colour; but is pale within, a little gummous, and contains a whitiſh pith. It ſmells almoſt like parſnips, though more aromatic; and the taſte is not diſagreeable, though it is acrid and a little bitter. It is dry and carminative, expelling wind, and helping the cholic and gripes: it is alſo alexipharmic, and good againſt peſtilential diſtempers, being an ingredient in the theriaca and mithridate: it is alſo reckoned good againſt the ſtone, and for ſtoppages of the urine.

SPIKE, or *oil of* SPIKE, a name given to an eſſential oil diſtilled from lavender, and much uſed by the varniſh makers, and the painters in enamel, and of ſome uſe in medicine.

SPIKENARD, *nardus*, in botany. See the article NARDUS,

Ploughman's SPIKENARD, in botany, the ſame with the conyza, or flea-bane. See the article CONYZA.

SPINA BIFIDA, in anatomy, a parting of the ſpinal proceſſes into two rows: the exiſtence of ſuch a caſe is doubted. See the article SPINE.

SPINA VENTOSA, in ſurgery and medicine, that ſpecies of corruption of the bones which takes its riſe in the internal parts, and by degrees enlarges the bone, and raiſes it into a tumour, and which, when it happens to children, is termed by Severinus, and many others, pædarthrocaces.

SPINACH, or SPINAGE, *Spinacia*, in botany, a genus producing male and female flowers on different plants. The male flower has no corolla; but the cup is divided into five oblong, obtuſe, concave ſegments; and contains five capillary filaments, topped with oblong twin antheræ. The cup of the female flower is divided into four parts. The corolla is wanting. It contains a roundiſh compreſſed germen, which ſupports four capillary ſtyles, which are each crowned with a ſingle ſtigma. The ſeed is incloſed in the cup; and is either of a roundiſh form, or armed with two or three thorns.

There are two kinds of ſpinach cultivated in gardens for culinary purpoſes; and are diſtinguiſhed by gardeners by the title of prickly ſpinach, and round leaved ſpinach. They are both propagated from ſeeds: the former is ſown in Auguſt for winter and ſpring uſe, which when come up, ſhould be hoed out about three or four inches diſtance, and, if neceſſary, repeated a ſecond time, and by having a ſufficient quantity, will be fit for uſe all the winter, obſerving to crop the larger leaves as they are wanted. The other ſort of ſpinach has rounder leaves, and the ſeeds are without prickles: this is not ſo hardy as the winter ſort; it is therefore more commonly ſown in the ſpring, on an open ſpot of ground,

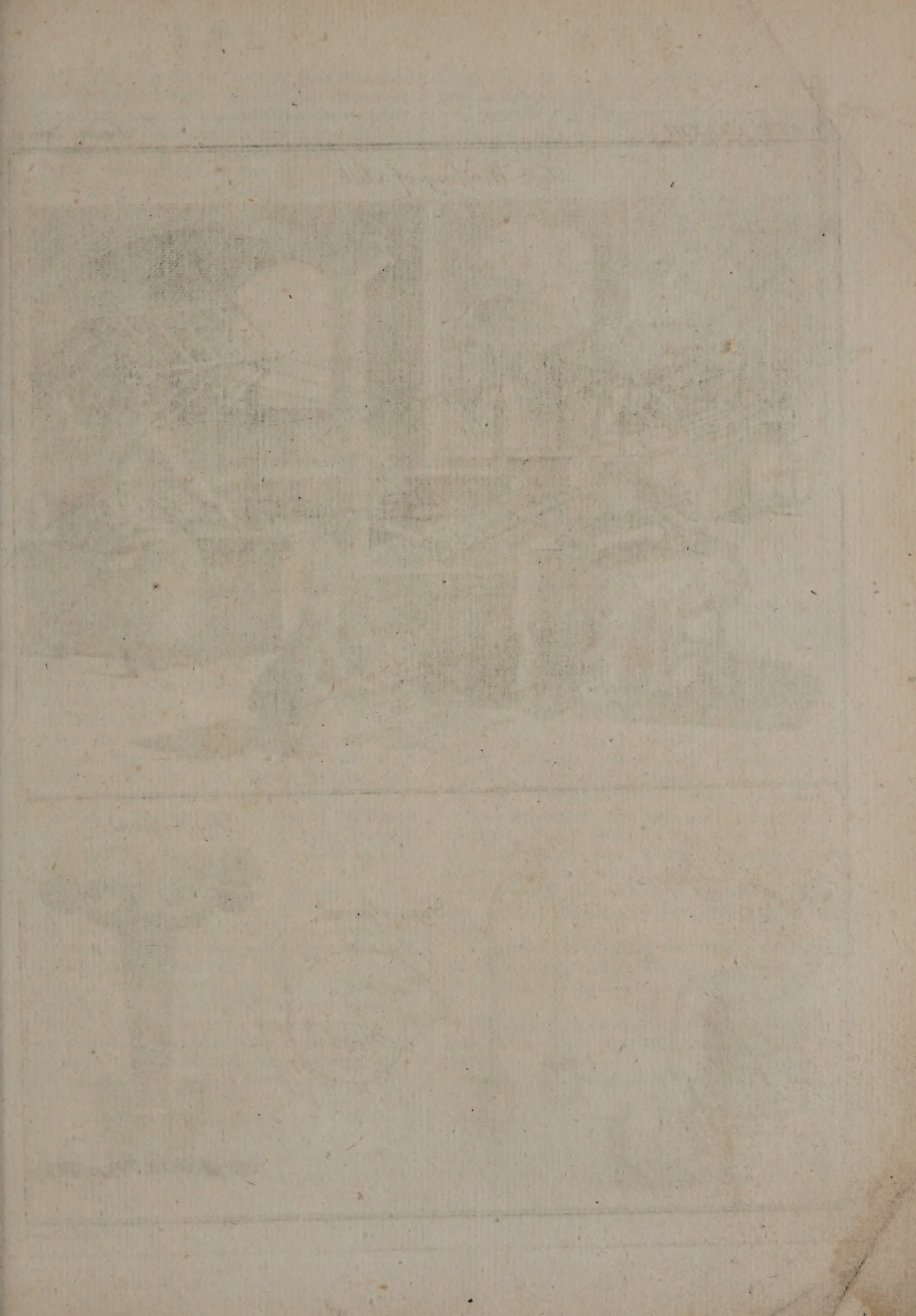
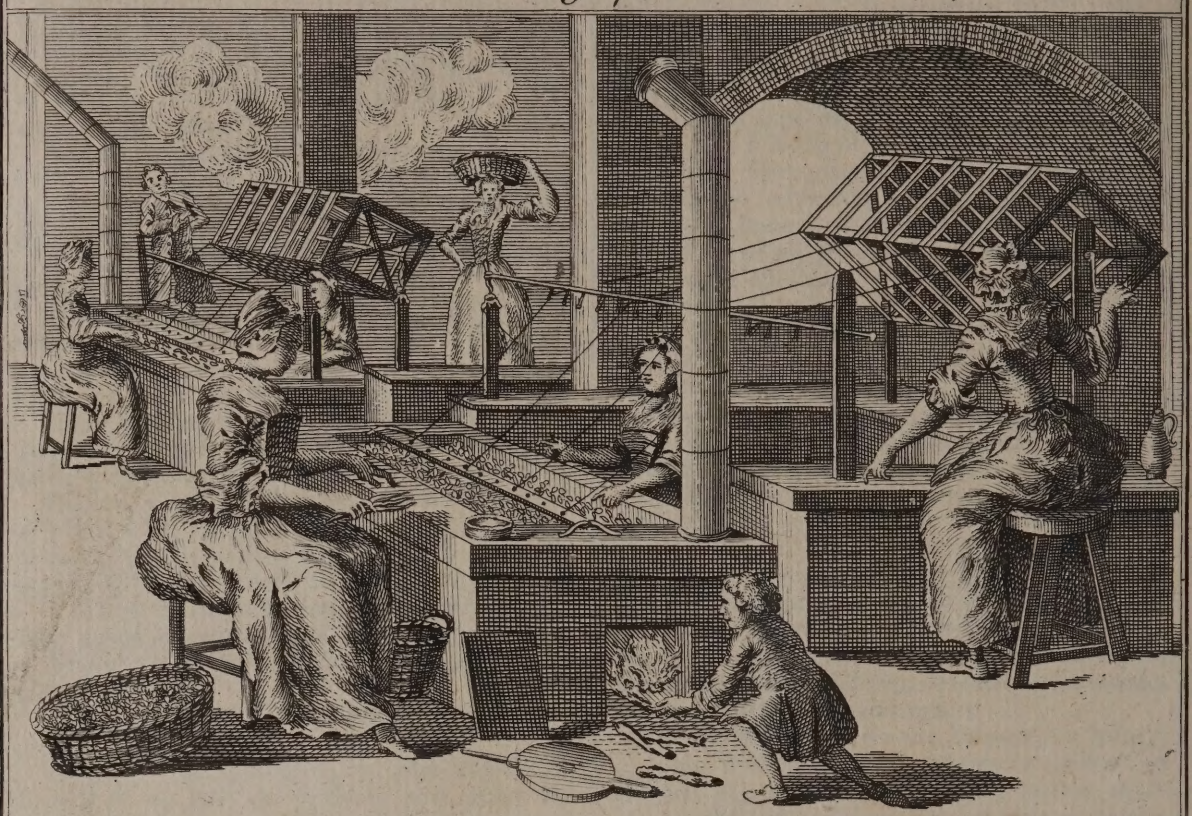


Fig. 1. Winding of Silk.



Siphons.

Fig. 2.

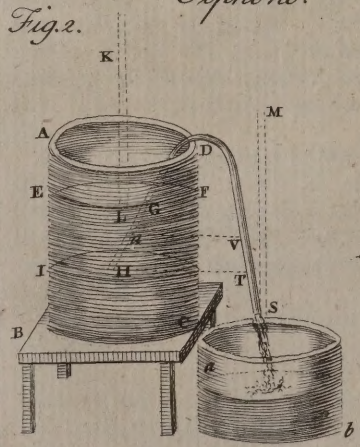


Fig. 3.

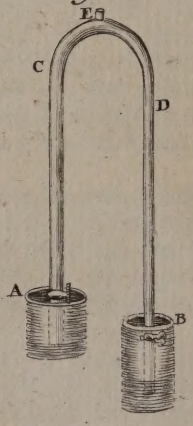


Fig. 4. Spiral.

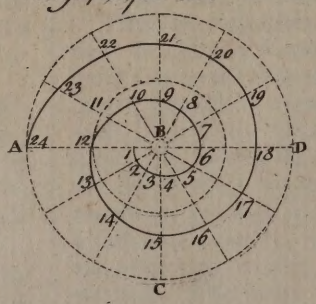
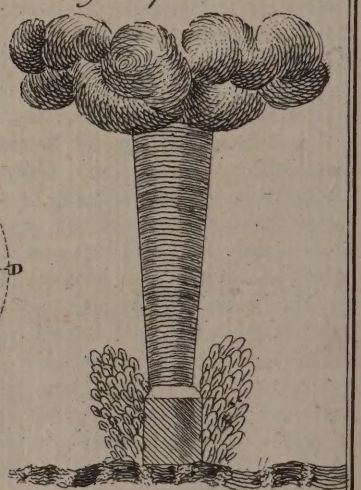


Fig. 5. Spout.



ground, and when the plants are up ſhould be hoed out as the former; but as they ſoon run up to ſeed, and are then unfit for uſe, it is therefore neceſſary for their longer continuance to ſow at four different ſeaſons in the ſpring, *viz.* January, February, March, and April, after which time they run to ſeed almoſt as ſoon as the plants are up, particularly in dry weather.

Spinach is ſaid to temperate acrid bilious humours in the firſt paſſages; but as it is watery, ſome correct it with ſalt, pepper, and other ſpices. It does not yield much nouriſhment; but it is not unwholeſome, and generally keeps the body open.

It is not uſed in medicine, except in counterfeiting the colour of ſome things of value, as particularly giving to Gaſcoign's powder the ſame colour as is given by bezoar.

SPINALIS, in anatomy, the names of ſeveral muſcles, *&c.* of the ſpine, but more particularly that of a muſcle on the ſide of the neck, ariſing from the five ſuperior proceſſes of the vertebræ of the thorax, and the inferior of the neck; and which in its aſcent, becoming more fleſhy, is inſerted into the inferior part of the vertebræ of the neck laterally. It ſerves to draw the neck backwards.

SPINDLE, in the ſea-language, is the ſmalleſt part of a ſhip's capſtan, which is betwixt the two decks. The ſpindle of the jeer-capſtan has whelps to heave the viol.

The axis of the wheel of a watch or clock, is alſo called the ſpindle. Among miners, the ſpindle is a piece of wood faſtened into either ſtow-blade.

SPINDLE-TREE, *Euonymus*, in botany. See the article EUONYMUS.

SPINE, SPINA-DORSI, in anatomy, the bony column reaching from the head down to the anus; being the ſeries or aſſemblage of vertebræ which ſuſtain the reſt of the body, contain the ſpinal marrow, and to which the ribs are connected.

SPINET, or SPINNET, a muſical inſtrument ranked in the ſecond or third place among harmonious inſtruments. It conſiſts of a cheſt or belly made of the moſt porous and reſinous wood to be found, and a table of fir glued on ſlips of wood called ſummers, which bear on the ſides. On the table is raiſed two little prominences or bridges, wherein are placed ſo many pins as there are chords or ſtrings to the inſtrument. It is played on by two ranges of continued keys, the former range being the order of the diatonic ſcale, and that behind, the order of the artificial notes or ſemi-tones. The keys are ſo many flat pieces of wood, which, touched and preſſed down at the end, make the other raiſe a jack which ſtrike and ſound the ſtrings by means of the end of a crow's quill wherewith it is armed. The thirty firſt ſtrings are of braſs, the other more delicate ones of ſteel or iron-wire; they are all ſtretched over the two bridges already mentioned. The figure of the ſpinet is a long ſquare or parallelogram; ſome call it an harp-couched, and the harp an inverted ſpinet.

SPINNING, in commerce, the act or art of reducing ſilk, flax, hemp, wool, hair, or other matters, into thread. Spinning is either performed on the wheel with a diſtaff and ſpindle, or with other machines proper for the ſeveral kinds of working. Hemp, flax, nettle-thread, and the like vegetable matters, are to be wetted in ſpinning; ſilks, wools, *&c.* are to be ſpun dry, and do not need water; but there is a way of ſpinning ſilk as it comes off the caſes or balls, where hot and even boiling water is to be uſed.

SPINOSE LEAVES, among botaniſts, are thoſe whoſe ſurfaces or edges are armed with cartilaginous points, and ſo firmly affixed, that they cannot be ſeparated without injuring the body of the leaves: ſuch are thoſe of the holly-tree, *&c.*

SPINOZISM, or SPINOSISM, the doctrine of Spinoza, or atheiſm and pantheiſm propoſed after the manner of Spinoza, who was born a Jew at Amſterdam.

The great principle of Spinoziſm, is that there is nothing properly and abſolutely exiſting beſides matter and the modifications of matter; among which are even comprehended thought, abſtract and general ideas, compariſons, relations, combinations of relations, &c.

SPINSTER, in law, an addition uſually given to all unmarried women from the viſcount's daughter downwards; but, according to Sir Edward Cooke, generoſa is a good addition for a gentlewoman; and that if ſuch a perſon be named ſpinſter in any original writ, appeal, or indictment, ſhe may abate and quaſh the ſame.

SPIRÆA, in botany, a genus of plants whoſe flower is roſaceous; and conſiſts of five oblong, roundiſh, petals, which are inſerted in a monophyllous cup. The filaments are ſlender; and twenty or more in number; and terminated with roundiſh antheræ. The germina are five or more in number, ſupporting as many ſlender ſtyles, which are crowned with capitated ſtigmata. The fruit is an oblong, compreſſed, acuminated capſule, formed of two valves, containing a few ſmall acuminated ſeeds.

This genus includes the common ſpiræa frutex and Hypericum frutex, to which Linnæus has added the filipendula, ulmaria, and barba capræ of Tournefort.

SPIRAL, in geometry, a curve line of the circular kind, which, in its progreſs, recedes from its center.

A ſpiral, according to Archimedes, its inventor, is thus generated: if a right line, as AB (Plate LXXXIII. fig. 4.) having one end fixed at B, be equally moved round, ſo as with the other end A to deſcribe the periphery of a circle; and, at the ſame time, a point be conceived to move forward

ward equally from B towards A, in the right-line B A, ſo as that the point deſcribes that line, while the line generates the circle: then will the point, with its two motions, deſcribe the curve-line B 1, 2, 3, 4, 5, &c. which is called the helix or ſpiral line; and the plane ſpace, contained between the ſpiral line and the right line B A, is called the ſpiral ſpace.

If alſo you conceive the point B to move twice as ſlow as the line A B, ſo as that it ſhall get but half way along the line B A, when that line ſhall have formed the circle; and if then you imagine a new revolution to be made of the line carrying the point, ſo that they ſhall end their motion at laſt together, there will be formed a double ſpiral line, and the two ſpiral ſpaces, as you ſee in the figure. From the geneſis of this curve, the following corollaries may be eaſily drawn. 1. The lines B 12, B 11, B 10, &c. making equal angles with the firſt and ſecond ſpiral (as alſo B 12, B 10, B 8, &c.) are in arithmetical proportion. 2. The lines B 7, B 10, &c. drawn any how to the firſt ſpiral, are to one another as the arches of the circle intercepted between B A and thoſe lines. 3. Any lines drawn from from B to the ſecond ſpiral, as B 18, B 22, &c. are to each other as the aforeſaid arches, together with the whole periphery added on both ſides. 4. The firſt ſpiral ſpace is to the firſt circle as 1 to 3. And, 5. The firſt ſpiral line is equal to half the periphery of the firſt circle; for the radii of the ſectors, and conſequently the arches, are in a ſimple arithmetic progreſſion, while the periphery of the circle contains as many arches equal to the greateſt; wherefore the periphery to all thoſe arches is to the ſpiral lines as 2 to 1.

SPIRAL, in architecture and ſculpture, implies a curve that aſcends, winding about a cone or ſpire, ſo as all the points thereof continually approach the axis. It is diſtinguiſhed from the helix, by its winding around a cone, whereas the helix winds in the ſame manner around a cylinder.

Proportional SPIRALS, are ſuch ſpiral lines as the rhumb lines on the terreſtrial globe, which, becauſe they make equal angles with every meridian, muſt alſo make equal angles with the meridians in the ſtereographic projection on the plane of the equator; and therefore will be, proportional ſpirals about the polar point.

SPIRE, *ſpira*, in architecture, was uſed by the antients for the baſe of a column, and ſometimes for the aſtragal or tore. But, among the moderns, it denotes a ſteeple that continually diminiſhes as it aſcends, whether conically or pyramidally.

SPIRIT, *ſpiritus*, in metaphyſics, an incorporeal being or intelligence; in which ſenſe, God is ſaid to be a ſpirit, as are angels and the human ſoul.

SPIRIT, in chemiſtry, a name applied to ſeveral very different ſubſtances; however, in general, it denotes any diſtilled volatile liquor that is not inſipid, as phlegm, or pure water, nor inflammable as oil: but under this general idea are comprehended liquors of quite oppoſite natures, ſome being acid, and others alkaline; which laſt are ſuch enemies to the former, that as ſoon as they are put together they raiſe a violent effervescence, and grow hot: and to theſe may be added a third ſort, called vinous or inflammable ſpirits; which though very ſubtile and penetrating, are not manifeſtly either acid or alkaline.

SPIRITS, or ANIMAL SPIRITS, in phyſiology. See ANIMAL SPIRITS.

SPIRITUAL, in general, ſomething belonging to, or partaking of, the nature of ſpirit.

SPIRITUALITIES *of a Biſhop*, are the profits that he receives as a biſhop, and not as a baron of parliament; ſuch are the duties of his viſitation, preſentation-money, what ariſes from the ordination and inſtitution of prieſts, the income of his juriſdiction, &c.

SPITTLE, *Saliva*, in phyſiology. See the article SALIVA.

SPLACHNUM, in botany, a genus of moſſes, the male flower of which is pedunculated, the cup is a ſmooth conic calyptra; the anthera is cylindric, and opening into eight reflexed dentules at its mouth, but is deſtitute of a ring, under it is a large coloured membranaceous receptacle; the cup of the female flower is ſtar-ſhaped, compoſed of many ſubulated folioles, placed in an imbricated manner, and contains a number of ſhort, coloured, faſtigiate, central piſtils.

SPLEEN, σπλην, *Lien*, in anatomy, is a viſcus of a deep blackiſh-red colour, ſituated on the left ſide of the ſtomach, under the diaphragm, near the ribs, and above the left kidney. Its figure is ſomewhat uncertain; but is uſually like that of a tongue, being hollow towards the ſtomach, and convex towards the diaphragm and ribs: however, it is often irregular, and has in many parts fiſſures. It is connected with the ſtomach, by the vaſa brevia, and with the pancreas, omentum, the diaphragm, and left kidney by membranes. Its ſize is various, uſually five or ſix inches long, three broad and one inch thick, in the human body: in dogs, hogs, and many other animals, it is much larger and thinner.

SPLEEN-WORT, *Lonchitis*, in botany. See the article LONCHITIS.

SPLENETIC, a perſon affected with obſtruction of the ſpleen.

SPLENIC-VESSELS, the artery and vein of the ſpleen.

SPLENIUS, in anatomy, a pair of the extenſor muſcles of the head, which riſing from the lower vertebra of the neck, and the five upper ones of the back, is inſerted a little above the maſtoide proceſs. See the article MUSCLE.

SPLENT, or SPLINT, among farriers, a callous, inſenſible excreſcence, breeding on the ſhank-bone of horſes; which, when it grows big, ſpoils the ſhape of the leg, and generally comes upon the inſide: but if there be one oppoſite to it on the outſide, it is called a peg, or pinned ſplent; becauſe it does, as it were, pierce the bone, and is extremely dangerous.

The ſimple ſplents are only faſtened to the bone, at a pretty diſtance from the knee, and without touching the back ſinew, and have not a very bad conſequence; but thoſe that touch the back ſinew, or are ſpread on the knee, will make a horſe lame in a ſhort time.

For the cure of this malady, ſhave away the hair, and rub and beat the ſwelling with the handle of a ſhoeing hammer; then having burnt three or four hazle ſticks, while the ſap is in them, chafe the ſplent with the juice, or water that iſſues out at both ends, applying it as hot as you can, without ſcalding the part: after that, rub or bruiſe the ſwelling with one of the ſticks, and continue frequently to throw the hot juice upon the part, but ſo as not to ſcald it, and continue ſtill rubbing it, till it grows ſoft. Then dip a linen-cloth, five or ſix times double in the hazel-juice, as hot as your hands can endure it, and tie it upon the ſplent, where let it remain for twenty four hours, keeping the horſe in the ſtable for the ſpace of nine days, not ſuffering him to be either ridden or led to water; by which time the ſplent will be diſſolved, and the hair will afterwards grow on it again.

SPLENTS, or SPLINTS, in ſurgery, pieces of wood, uſed in binding up broken limbs.

SPLICING, in the ſea language, is the untwiſting the ends of two cables or ropes, and working the ſeveral ſtrands into one another by a fidd, ſo that they become as ſtrong as if they were but one rope. See CABLE, &c.

SPODIUM, in pharmacy, one of the fouleſt recrements of copper; being nothing but the worſt and heavieſt parts of the cadmia oſtracitis, thrown up in ſuch coarſe pieces by the blaſt of the bellows, that it does not adhere to the roof or ſides of the furnace, but falls down again into ſeveral parts of the furnace; and being collected along with many other kinds of foulneſſes, in form of a blackiſh heavy matter, is indeed no better than the ſweepings of the furnaces, where the copper is refined.

SPOILS, *Spolia*, whatever is taken from the enemy, in time of war.

SPONDEE, *Spondæus*, in ancient poetry, a foot conſiſing of two long ſyllables, as *omnes*. See the article FOOT.

SPONDIAS, Braſilian plum, in botany, a genus of plants, whoſe flower conſiſts of five oblong, plane, patent petals; the ſtamina are compoſed of ten ſubulated filaments, ſhorter than the corolla, but alternately longer; theſe are topped with oblong antheræ: the fruit is a large oblong drupe, containing an ovate, ligneous, fibroſe drupe, having five angles and five cells.

SPONDYLUS, in anatomy, a name anciently given to a vertebra of the ſpina dorſi.

SPONGIOSE, in anatomy, an appellation given to ſeveral parts of the body, on account of their porous and cavernous texture, not unlike that of ſpunge; as the ſpongioſe or ethmoide bone of the noſe, the ſpongioſe bodies of the penis. See NOSE and PENIS.

SPONSORS, among Chriſtians, are thoſe perſons, who, in the office of baptiſm, anſwer, or are ſureties, for the perſons baptized.

SPONTANEOUS, a term applied to ſuch motions of the body, and operations of the mind, as we perform of ourſelves, without any conſtraint.

SPOONWORT, *Cochlearia*, in botany. See the article COCHLEARIA.

SPOONING, in the ſea-language, is ſaid of a ſhip, which, being under ſail in a ſtorm at ſea, is unable to bear it, and conſequently forced to put right before the wind.

SPORADES, among ancient aſtronomers, a name given to ſuch ſtars, as were not included in any conſtellation.

SPORADIC DISEASES, among phyſicians, are ſuch as ſeize particular perſons at any time or ſeaſon, and in any place; in which ſenſe they are diſtinguiſhed from epidemical and endemic diſeaſes; the former whereof are peculiar to certain times or ſeaſons, and the latter to certain places or countries.

SPOTS, in aſtronomy, certain places of the ſun's or moon's diſc, obſerved to be either more bright, or darker, than the reſt; and, accordingly, called faculæ and maculæ.

SPOUT, or WATER-SPOUT, in natural hiſtory, an extraordinary and dangerous meteor, obſerved at ſea, and ſometimes at land, called by the Latins typho and ſipho. Its firſt appearance is in form of a deep cloud, the upper part of which is white, and the lower black: then from the lower part of this cloud hangs, or rather falls down, what is properly called the ſpout, in form of a conical tube, biggeſt at top; and under this tube, there is always a great boiling and flying up of the water of the ſea, as in a jet d'eau. For ſome yards above the ſurface of the ſea, the water ſtands as a column or pillar, from the extremity whereof it ſpreads and goes off, as in a kind of ſmoke. Frequently, the cone deſcends ſo low, as to touch the middle of this column, and continue for ſome time contiguous to it; though ſometimes it only points to it, at ſome diſtance, either in a perpendicular or oblique line. Frequently it is ſcarce diſtinguiſhable, whether the cone or the column appear the firſt, both appearing all of a ſudden againſt each other. But ſometimes the water boils up from the ſea to a great height, with-

without any appearance of a ſpout pointing to it, either perpendicularly or obliquely. Indeed, generally, the boiling or flying up of the water has the priority, this always preceding its being formed into a column. Generally, the cone does not appear hollow, till towards the end, when the ſea-water is violently thrown up along its middle, as ſmoke up a chimney. Soon after this, the ſpout or canal diſappears; the boiling up of the water, and even the pillar, continuing to the laſt, and for ſome time afterwards; ſometimes till the ſpout form itſelf again, and appear a-new; which it ſometimes does ſeveral times in a quarter of an hour. See plate LXXXIII. fig. 5.

SPRAT, in ichthyology, a ſpecies of clupea, with the lower jaw longeſt, and the belly very acute.

The ſprat has been generally, but erroneouſly, ſuppoſed a herring, not grown to its full ſize; its uſual length is about four or five inches, and its breadth ſomewhat more, in proportion, than in the herring; there is a ſpot on each ſide, near the extremity of the coverings of the gills. It is caught in moſt of our ſeas, and brought in ſurpriſing quantities to London.

SPRING, *Fons*, in natural hiſtory, a fountain, or ſource of water, riſing out of the ground.

Various have been the opinions of philoſophers concerning the origin of ſprings; but thoſe which deſerve notice, are only the three following ones:

1. That the ſea-water is conveyed through ſubterraneous ducts, or canals, to the places where the ſprings flow out of the earth: but as it is impoſſible that the water ſhould be thus conveyed to the tops of mountains, ſince it cannot riſe higher than the ſurface, ſome have had recourſe to ſubterraneous heats; by which, being rarified, it is ſuppoſed to aſcend in vapours through the bowels of the mountains. But as no ſufficient proof is brought of the exiſtence of theſe central heats, or of caverns in the mountains big enough to let the vapours aſcend, ſuppoſing ſuch heats, we ſhall not take up our reader's time with a formal refutation of this hypotheſis.

2. As to thoſe who advance the capillary hypotheſis, or ſuppoſe the water to riſe from the depths of the ſea through the porous parts of the earth, as it riſes in capillary tubes, or through ſand or aſhes, they ſeem not to conſider one principal property of this kind of tube, or this ſort of attraction; for though the water riſe to the top of the tube or ſand, yet it will riſe no higher, becauſe it is by the attraction of the parts above that the fluid riſes, and where that is wanting it can riſe no farther. Therefore, though the waters of the ſea may be drawn into the ſubſtance of the earth by attraction, yet it can never be raiſed by this means into a ciſtern, or cavity, to become the ſource of ſprings.

3. The third hypotheſis is that of the ſegacious naturaliſt, Dr. Halley, who ſuppoſes the true ſources of ſprings to be melted ſnow, rain-water, dew, and vapours condenſed.

Now, in order to prove that the vapours, raiſed by the heat of the ſun, from the ſurface of the ſeas, lakes, and rivers, are abundantly ſufficient to ſupply the ſprings and rivers with freſh water, the doctor made the following experiment: he took a veſſel of water, made of the ſame degree of ſaltneſs with that of the ſea, by means of the hydrometer; and having placed a thermometer in it, he brought it, by means of a pan of coals, to the ſame degree of heat with that of the air in the hotteſt ſummer. He then placed this veſſel, with the thermometer in it, in one ſcale, and nicely counterpoiſed it with weights in the other; after two hours, he found, that about the ſixtieth part of an inch was gone off in vapour, and conſequently in twelve hours, the length of a natural day, one-tenth of an inch would have been evaporated.

From this experiment it follows, that every ten ſquare inches of the ſurface of the water yield a cubic inch of water in vapour per day, every ſquare mile 6914 tons, and every ſquare degree (or 69 Engliſh miles) 33 millions of tons. Now, if we ſuppoſe the Mediterranean to be 40 degrees long, and four broad, at a medium, which is the leaſt that can be ſuppoſed, its ſurface will be 160 ſquare degree, from whence there will evaporate 5280 millions of tons per day, in the ſummer-time.

The Mediterranean receives water from the nine great rivers following, viz. the Iberis, the Rhine, the Tyber, the Po, the Danube, the Neiſter, the Boryſthenes, the Tanais, and the Nile; all the reſt being ſmall, and their water inconſiderable.

Now, let us ſuppoſe, that each of theſe rivers conveys ten times as much water to the ſea as the Thames, which, as is obſerved, yields daily 76,032,000 cubic feet, which is equal to 203 millions of tons; and therefore all the nine rivers will produce 1827 millions of tons, which is little more than one-third of the quantity evaporated each day from the ſea. The prodigious quantity of water remaining, the doctor allows to rains, which fall again into the ſeas, and for the uſes of vegetation.

As to the manner in which theſe waters are collected, ſo as to form reſervoirs for the different kinds of ſprings, it ſeems to be this: the tops of mountains, in general, abound with cavities, and ſubterraneous caverns formed by nature to ſerve as reſervoirs; and their pointed ſummits, which ſeem to pierce the clouds, ſtop thoſe vapours which fluctuate in the atmoſphere, and being conſtipated thereby, they precipitate in water, and by their gravity, eaſily penetrate through beds of ſand and lighter earth, till they are ſtopped in their deſcent by more denſe ſtrata, as beds of clay, ſtone, &c. where they form a baſon, or cavern, and work a paſſage horizontally, and iſſue out at the ſide of the mountain.

Many

Many of these springs running down by the valleys, between the ridges of hills, and uniting their streams, form rivulets or brooks; and many of these, again, uniting on the plain, become a river.

Medicinal Virtues, &c. of SPRINGS. These are owing to the different qualities and temperament of the strata through which these waters may be collected, or pass; if those reservoirs of water in the body of mountains be situated where mineral ores abound, or the ducts and feeding streams run thro' mineral earths, it is easy to conceive that particles of metal will mix with, and be absorbed by, the water, which being saturated therewith, becomes a mineral spring, or well.

If salt, sulphur, lime-stone, &c. abounds in the strata, through which the water passes, it will then be saline, sulphureous, lime-water, &c. If sulphur and iron should both abound in the parts of the hill, whence the waters come, the waters will partake of the warmth or heat which is occasioned by the mixture of two such substances in the earth, where they are found. See MINERAL WATERS, CHALYBEATE WATERS, SEA WATER, BATH WATERS, &c.

SPRING, *Ver*, in cosmography, implies one of the seasons of the year; commencing, in the northern parts of the world, on the day the sun enters the first degree of Aries, which is about the twenty-first of March, and ending when the sun leaves Gemini.

SPRING, *Elater*, in mechanics, denotes a thin piece of tempered steel, or other elastic substance; which, being wound up, serves to put several machines in motion by its elasticity, or endeavour to unbend itself: such is the spring of a clock, watch, and the like.

The spring of a lock, gun, pistol, or the like, is a piece of steel, violently bent; which, being set at liberty, beats back the bolt of the lock, or strikes down the cock.

SPRING-TIDE. See the article TIDE.

SPRINGE, among sportsmen, a device made of twisted wire, to catch birds or small beasts.

SPRINGING *of a Mast*, in the sea-language, is when it cracks, but is not quite broken in any part of it; as the partners, hounds, &c.

SPRINGY BODIES, the same as elastic ones; or such as, having had their figure changed by the stroke of another body, can recover again their former figure, which bodies not elastic cannot do. See the article ELASTICITY.

SPUNGE, *Spongia*, in botany, a genus of submarine plants, belonging to the cryptogamia lithophyta class: it consists of a soft, tough, and elastic matter, formed usually into rude masses of a cavernous structure, and having very little of the appearance of plants.

Upon a nice examination, spunge appears to be composed of capillary fibres, which are hollow and implicated in a surprising manner; and are surrounded by thin membranes which arrange them into a cellular form. This structure, no less than the constituent matter, of spunge, renders it the fittest of all bodies to imbibe a great quantity of any fluid, and upon a strong pressure, to part with almost the whole quantity again.

Spunge, calcined to a blackness, and reduced to powder, has been lately brought into great use as a sweetner of the blood, and a diuretic: some have pretended even to cure leprosies with it, and others have extolled it against the bite of a mad dog; but these are virtues less certainly known of it.

In the larger and coarser pieces of spunge, there are often small stones found imbedded in the substance of the matter; and yet, more frequently, a crustaceous sparry matter gathered round the surface of certain parts of the plants; both these substances are called by the common name of lapis spongiæ, the spunge-stone; and both are recommended as diuretics, and remedies against the stone and gravel. See the article SPAR.

Pyrotechnical SPUNGES, are made of the large fungous excrescences growing on old oaks, ashes, fir, &c. which being boiled in common water, then dried and well beaten, are put in a strong ley, prepared with salt-petre, and again dried in an oven. These make the black match, or tinder, brought from Germany, used to receive and sustain the fire struck from a flint and steel, &c.

SPUNGE, is also used, in gunnery, for a long staff, or rammer, with a piece of sheep or lamb-skin wound about its end, to serve for scouring great guns, when discharged, before they are charged with fresh powder.

SPUNGE *of a Horse-Shoe*, the part next the heel, where the calkins are made.

SPUNGING, in gunnery, the cleaning a gun's inside with a spunge, in order to prevent any sparks of fire from remaining in her, which would endanger the life of him who should load her again.

SPUN-YARN, among sailors, is a kind of line made from rope yarn, and used for seizing or fastening things together.

SPUR, a piece of metal, consisting of two branches encompassing a horseman's heel, and a rowel in form of a star, advancing out behind to prick the horse.

SPUR-WAY, a road through another's ground, through which one may ride by right or custom.

SPURGE, *Tithymalus*, in botany, a genus of plants, according to Tournefort, but comprehended among the euphorbias by Linnæus. See the article TITHYMALUS.

The common spurge, which grows wild in gardens, &c. is full of a milky juice, which, applied

to the ſkin, corrodes it into a ſcar, and is therefore uſed by beggars to excite compaſſion: it is ſeldom uſed in any medicinal forms; but the common people uſe it to eat off warts, which it will do, by frequent application, if the cruſt which hardens on them be cut off between whiles.

SPURGE-LAUREL, in botany, a ſpecies of daphne. See the article DAPHNE.

This is a low evergreen ſhrub, which riſes with ſeveral ſtalks from the root to the height of two or three feet, dividing upwards into ſeveral branches, which are furniſhed with thick ſpear-ſhaped leaves coming out irregularly on every ſide, and ſitting pretty cloſe to the branches, and are of a ſmooth and lucid green; between theſe, towards the upper part of the ſtalks, come out the flowers in ſmall cluſters of a yellowiſh green, in January, and are ſucceeded by oval berries, which are green till June, when they ripen to a black colour, and then fall off.

The whole plant is of a hot cauſtic taſte, burning and inflaming the mouth and throat; it is but little uſed in medicine.

SPURIOUS DISEASES, ſuch as, in ſome ſymptoms, cannot be reduced to any one kind; and therefore, are denominated from thoſe with which they agree in moſt particulars: thus we ſay, a ſpurious or baſtard pleuriſy, quinzy, &c.

SPURKETS, in a ſhip, ſpaces between the upper and lower futtocks, or between the rungs fore and aft.

SPURRY, *Spergula*, in botany. See the article SPERGULA.

SPUTUM, among phyſicians, denotes the ſame with the ſaliva, or ſpittle. See the article SPITTLE.

SPY, a perſon hired to watch the actions, motions, &c. of another; particularly of what paſſes in a camp. When a ſpy is diſcovered, he is hanged immediately.

SQUADRON, in military affairs, denotes a body of horſe, whoſe number of men is not fixed, but is uſually from one to two hundred.

SQUADRON *of Ships*, a diviſion or part of a fleet, commanded by a vice-admiral, or commodore.

SQUAMOUS, or SQUAMOSE, in anatomy, an appellation given to the ſpurious or falſe ſutures of the ſkull, becauſe compoſed of ſquamæ, or ſcales, like thoſe of fiſhes, or like tiles laid ſo as to reach over one another.

SQUARE, *Quadratum*, in geometry, a quadrilateral figure, both equilateral and equiangular.

To find the area of a ſquare, ſeek the length of one ſide; multiply this by itſelf, and the product is the area of the ſquare.

SQUARE-NUMBER, the product of a number multiplied into itſelf.

Thus 4, the product of 2 multiplied by 2; or 16, the product of 4 multiplied by 4, are ſquare numbers.

SQUARE-ROOT, a number conſidered as the root of a ſecond power or ſquare number; or a number, by whoſe multiplication into itſelf, a ſquare number is generated. See the article EXTRACTION.

SQUARE-BATTLE, or BATTALION *of Men*, is one that hath an equal number of men in rank and file.

Hollow SQUARE, in the military art, is a body of foot drawn up with an empty ſpace in the middle for the colours, drums, and baggage; faced and covered by the pikes every way, to keep off horſe.

SQUARE, *Norma*, an inſtrument conſiſting of two rulers, or branches, faſtened perpendicularly at one end of their extremes, ſo as to form a right angle: it is of great uſe in the deſcription and menſuration of right angles, and laying down perpendiculars.

SQUASH, in botany, a name uſed for a particular ſpecies of cucurbita. See CUCURBITA.

SQUILL, *Scilla*, in botany. See SCILLA.

SQUIRREL, *Sciurus*, in zoology, the Engliſh name of a genus of quadrupeds, the fore-teeth of which are prominent; it has no canine teeth; and its legs are formed both for climbing and leaping.

STABLE, a place or houſe for horſes, &c. furniſhed with ſtalls and proper apartment to contain their food, &c. See the article HORSE, &c.

STACK *of Wood*, among huſbandmen, a pile of wood three feet long, and as many broad, and twelve feet high.

STACHYS, baſe-horehound, in botany, a genus of plants whoſe flower is monopetalous and ringent; the tube is very ſhort; the upper lip is erect, hooked, and often emarginated; and the lower lip is large, reflexed and trifid. There is no pericarpium; but the cup contains four ovate angular ſeeds.

STADTHOLDER, STADTHOULDER, or STATHOLDER, the principal governor or magiſtrate of the United Provinces.

STÆHELINA, in botany, a genus of plants whoſe flower is compound and tubulous, conſiſting of ſeveral hermaphrodite corollulæ, which are monopetalous, and funnel-ſhaped, and contained in an oblong, cylindrical, imbricated cup. The ſeeds are oblong, very ſhort, and four-cornered, and crowned with a feathery down the length of the cup, and placed on a plane paleaceous receptacle.

STAFF, *Baculus*, an inſtrument ordinarily uſed to reſt on in walking. The ſtaff is alſo frequently uſed as a kind of natural weapon both of offence and defence, and for ſeveral other purpoſes.

STAFF, in muſic, five lines, on which, with the intermediate ſpaces, the notes of a ſong, or piece of muſic, are marked.

STAG, in zoology, a very ſtately and beautiful animal. People are apt to confound it with the common fallow deer, but with great impropriety, being

being of twice the ſize, and different in many other reſpects: the head is remarkably large: the neck ſtrong and thick: the eyes are full and large: the ears long and patulous: the horns tall, almoſt erect, and of a beautiful form; they riſe each with a ſingle and elegant ſtem, which continues its form to the top, only ſending off branches and divarications: they are hairy when once formed, but afterwards they become very ſtrong, and loſe that downy appearance. The body of the ſtag is rounded and plump: the back ſomewhat flatted, and the belly prominent; the legs are long: the hoofs cloven: the fur deep, thick, and of a tawny reddiſh colour.

STAGE, in the modern drama, the place of action and repreſentation, included between the pit and the ſcenes, and anſwering to the proſcenium, or pulpitum, of the ancients.

STAIR-CASE, in architecture, an aſcent incloſed between walls, or a balluſtrade, conſiſting of ſtairs, or ſteps, with landing-places and rails, ſerving to make a communication between the ſeveral ſtories of a houſe.

STAKE, the name of a ſmall anvil, uſed by ſmiths; ſometimes it ſtands on a broad iron-foot on the work-bench, to be moved up and down occaſionally; and ſometimes it hath a ſtrong iron-ſpike at the bottom, by which it is fixed to ſome place on the work-bench. Its uſe is to ſet ſmall and cold work ſtraight, by hammering it on the ſtake; or to cut or punch upon the cold chiſſel or cold punch.

STALACTITÆ, or STALACTAGNIA, ſtony icicles, in natural hiſtory, cryſtalline ſpars formed into oblong, conical, round, or irregular bodies, compoſed of various cruſts, and uſually found hanging in form of icicles from the roofs of grottos, &c. See SPAR.

STALE, among ſportſmen, a living fowl put in a place to allure and bring others where they may be taken. For want of theſe, a bird ſhot, his entrails taken out, and dried in an oven in his feathers, with a ſtick thruſt through to keep it in a convenient poſture, may ſerve as well as a live one.

STALE is alſo a name for the urine of cattle.

STALK, in botany, that part of a plant which riſes immediately from the root, and which ſupports the leaves of the flowers and the fruit.

The term ſtalk is uſed on all occaſions; but in ſpeaking of the graſſes and gramineous plants, the word culm is uſed in its place, to diſtinguiſh that peculiar kind of ſtalk, which is general to all theſe plants, and is not found in any others.

STALKING, a term uſed in fowling, and applied to a kind of ſcreen, or device, to hide the fowler and amuſe the game, while he gets within ſhot.

STALLION, or STONE-HORSE, in the manege, an ungelt horſe, deſigned for the covering of mares, in order to propagate the ſpecies.

STAMINA, among botaniſts, are the male organs of generation in flowers, and defined by Linnæus as an entrail of a plant deſigned for the preparation of the pollen or male duſt. Each ſingle ſtamen conſiſts of two parts, a filament and anthera; though ſometimes the filament is wanting.

By the conſtruction, number, and diſtribution of the ſtamina, Linnæus's ſyſtem of botany is principally founded and regulated thereby. Tournefort takes the uſe of the ſtamina to be as it were ſo many excretory canals for diſcharging the growing embryo of its redundant juices; and of theſe excrements of the fruit, he takes that farina or duſt found in the antheræ to be formed: but other writers, as Geoffrey, and Linnæus in particular, aſſign the ſtamina a nobler uſe. Theſe authors explain the generation of plants in a manner analogous to that of animals: they maintain the uſe of the ſtamina to be that of ſecreting in their fine capillary canals a juice, which, being collected, hardened, and formed into a farina, or duſt, in the tips of the apices, is thence, when the flower is arrived to maturity diſcharged by the burſting of the apices or antheræ on the top of the piſtil, whence is a paſſage for it to deſcend into the uterus or germen; where being received, it impregnates and fœcundifies that part which is deſtined for the fruit and ſeeds. See BOTANY, GENERATION OF PLANTS, FARINA, and PISTIL.

STAMINA, in the animal body, are defined to be theſe ſimple original parts, which exiſted firſt in the embryo, or even in the ſeed, and by whoſe diſtinction, augmentation, and accretion, by additional juices, the animal body at its utmoſt bulk, is ſuppoſed to be formed. See GENERATION.

STAMINEOUS, in botany, a term uſed by authors, for thoſe flowers of plants which have no petals or flower-leaves, but conſiſt only of a number of ſtamina and piſtils, placed in a cup. This cup is ſometimes miſtaken for a flower, and its leaves thought to be true petals, but they remain when the ſtamina are fallen, and become the capſules, containing the ſeed; which according to Tournefort is the true character of a cup, not of a flower.

STAMPT-DUTIES, certain impoſitions laid on all parchment and paper, on which deeds, grants, or other inſtruments, or any proceſs in law or equity, are ingroſſed or written.

The ſtamp-duties are alſo extended to almanacs, news-papers, pamphlets, cards and dice. All pamphlets above a ſheet, and under ſix ſheets in octavo, twelve in quarto, or twenty in folio, are ſubject to a ſtamp duty.

STAMPS, in metallurgy, a ſort of large peſtles, lifted

lifted up by water wheels, and ſerving to beat to powder the ores, and the refuſe of ores, of metals. This engine is called the ſtamping-mill, and ſometimes the knocking-mill.

STANCHION, or STANCHIONS, in a ſhip, thoſe pillars, which being ſet up pillar-wiſe, do ſupport and ſtrengthen the waſte-trees.

STAND, in commerce, a weight, from two hundred and a half to three hundred, of pitch.

STANDARD, in war, a ſort of banner, or flag, borne as a ſignal for the joining together of the ſeveral troops belonging to the ſame body. See FLAG, &c.

STANDARD, in commerce, the original of a weight, meaſure, or coin, committed to the keeping of a magiſtrate, or depoſited in ſome public place, to regulate, adjuſt, and try the weights uſed by particular perſons in traffic.

STANDARDS, or STANDELS, in huſbandry, are young trees, reſerved at the felling of woods, for the growth of timber.

STANDING, in the ſea-language. Standing part of the ſheet, is that part of it which is made faſt to a ring at the ſhip's quarter. Standing part of a tackle, is the end of the rope where the block is faſtened. Standing ropes, are thoſe which do not run in any block, but are ſet taut or let ſlack, as occaſion ſerves; as the ſheet-ſtays, back-ſtays, or the like.

STANNARIES, the mines and works where tin is dug and purified, as in Cornwal, Devonſhire, &c.

STANZA, in poetry, a certain ſtated number of verſes, generally containing a perfect ſenſe, that ought to end with ſome lively and ingenious thought, or juſt and pertinent reflection.

STAPES, in anatomy, one of the officula auditoria, being a leſſer bone ſituated in the cavity of the feneſtra ovalis: thus called from its reſembling a ſtirrup. See EAR.

STAPLE, primarily ſignifies a public place or market, whither merchants, &c. are obliged to bring their goods to be bought by the people.

Formerly the merchants of England were obliged to carry their wool, cloth, lead, and other like ſtaple commodities of this realm, in order to utter the ſame by wholeſale; and theſe ſtaples were appointed to be conſtantly kept at York, Lincoln, Newcaſtle upon Tyne, Norwich, Weſtminſter, Canterbury, Chicheſter, Wincheſter, Exeter, and Briſtol; in each whereof a public mart was appointed to be kept, and each of them held a court of the mayor of the ſtaple, for deciding differences, held according to the law-merchant, in a ſummary way.

The ſtaple-commodities of this kingdom are ſaid by ſome to be theſe, viz. wool, leather, wool-fells, lead, tin, butter, cheeſe, cloth, &c. but others allow only the firſt five to be ſtaple-commodities.

Staple ſignifies alſo a city or town, where the merchants jointly agree to carry certain commodities.

STAR, *Stella*, in aſtronomy, a general name for all the heavenly bodies, which, like ſo many brilliant ſtuds, are diſperſed throughout the whole heavens.

The ſtars are diſtinguiſhed, from the phænomena of their motion, &c. into fixed, and erratic or wandering ſtars; theſe laſt are again diſtinguiſhed into the greater luminaries, viz. the ſun and moon; the planets, or wandering ſtars, properly ſo called; and the comets; each whereof has been fully conſidered and explained under their reſpective articles.

As to the fixed ſtars, or ſimply ſtars, they are ſo called becauſe they ſeem to be fixed, or perfectly at reſt, and conſequently appear always at the ſame diſtance from each other.

Diſtribution and Number of the fixed STARS.

An obſerver will firſt divide theſe ſtars into ſeveral claſſes, according to the ſplendor of their light; the brighteſt he will call ſtars of the firſt magnitude; thoſe of the next inferior light, he will call ſtars of the ſecond magnitude; and ſo in order to thoſe that can barely be ſeen by the naked eye, which are called ſtars of the ſixth magnitude: and thoſe which cannot be ſeen but by the help of magnifying glaſſes, are of the ſeventh, eighth, &c. magnitudes. Afterwards, to avoid confuſion, and to be able to point out any one ſtar, without being obliged to give a particular name to each, he will divide them into ſeparate parcels, of which he will make a particular plan; and to each of theſe conſtellations, or parcels of ſtars, he will aſſign a figure at pleaſure, as that of a ram, a bull, a dragon, a Hercules, &c. but ſo that all the ſtars in each of the parcels, drawn in the plan, may be incloſed in the deſigned figures, and correſpond to the different parts from whence they take their name: for example, having drawn the figure of a bull about a parcel, or conſtellation, of ſtars, that ſtar which falls in the eye, will be called the ſtar in the bull's eye, or ſimply, the bull's eye; another, which reſpects the tip of one horn, will be named the bull's horn; and ſo of others. A parcel of ſtars thus contained in any aſſigned figure, is called a conſtellation. See CONSTELLATION.

By this means, notwithſtanding the ſeeming impoſſibility of numbering the fixed ſtars, their relative ſituations one to another have been ſo carefully obſerved by aſtronomers, that they have not only been able to number them, but even to diſtinguiſh the place of each ſtar in the heavens, and that with greater accuracy than any geographer could ever point out the ſituations of the ſeveral cities or towns upon the ſurface of the earth; and not only the places of thoſe few, if they may be ſo called, which are to be ſeen with the naked eye, have been pointed out and regiſtered by them,

but

but even of thoſe which are diſcovered only by the teleſcope. The moſt antient obſervations of the ſtars, which have reached theſe times, were made by Timocharis and Arriſtillus, about 300 years before Chriſt. The next after them, who made a catalogue of the ſtars viſible to the naked eye, and regiſtered their places, was Hipparchus of Rhodes; he flouriſhed about 120 years before Chriſt, and numbered 1022 ſtars. After him Ptolemy enlarged his catalogue to 1026: Ulug Beigh, the grand-father of Tamerlane the Great, about the year 1437, conſtructed a new catalogue, more exact than that of Ptolemy, containing 1017 ſtars: Tycho, in the year 1600, determined the places of 777 fixed ſtars, and reduced them to a catalogue: Kepler's catalogue contained 1163 ſtars; and that of the prince of Heſſe, 400: Ricciolus enlarged Kepler's catalogue to 1468; and John Bayer, a German, had deſcribed the places of 1725 ſtars: after this, about 1670, Hevelius of Dantzick, compoſed a catalogue of 1888 fixed ſtars: Dr. Halley alſo undertook a voyage to the iſland of St. Helena, in order to take the poſition of the ſtars within the antartic circle, of which he publiſhed a catalogue, containing 373 ſtars: but the largeſt and moſt complete catalogue ever yet publiſhed, is that of our accurate aſtronomer Mr. Flamſtead, in his Celeſtial Hiſtory, which contains near 3000 ſtars; all whoſe places are more exactly determined in the heavens, than the poſition of cities and other places on the earth.

We ought not however to imagine, that all the fixed ſtars are thus numbered, and reduced to their reſpective places in the heavens; ſince their number continually increaſes, according to the goodneſs of the teleſcope, appearing millions beyond millions, till, by their immenſe diſtance, they evade the ſight, even though aſſiſted by the beſt inſtruments. The teleſcopical ſtars with which Mr. Flamſtead has enriched his catalogue, are only the more remarkable ones, whoſe longitutes and latitudes, or ſituations in the heavens, it was thought worth while to regiſter and put down. Dr. Hook, with a teleſcope of twelve feet, ſaw 78 ſtars among the pleiades; and with a longer teleſcope, ſtill more: and, in the ſingle conſtellation of Orion, which, in Mr. Flamſtead's catalogue, has but 80 ſtars, there have been ſeen 2000. We may therefore, venture to pronounce the number of fixed ſtars, including the teleſcopic ones, as well as thoſe viſible to the naked eye, to be infinitely great, far beyond what it is poſſible for the beſt aſtronomers to calculate, much leſs to reduce to order. But though the ſtars are certainly innumerable, yet thoſe viſible to the naked eye, in one hemiſphere, ſeldom exceed a thouſand; which, perhaps, may appear ſtrange, ſince, at firſt ſight their number ſeems immenſely great; but this is only a deception of ſight, ariſing from a confuſed and tranſient view; for let a perſon ſingle out a ſmall portion of the heavens, and after ſome attention to the ſituation of the more remarkable ſtars therein, begin to count, he will ſoon be ſurprized to find how few there are therein. However, even the number of ſtars viſible to the naked eye, ſmall as it is in compariſon with that of the teleſcopic ones, is far from being conſtant; ſince, beſides that the different ſtates of the atmoſphere renders many of the leſſer ſtars inviſible, ſome ſtars have been obſerved to appear and diſappear by turns; particularly one in the chair Caſſiopeia, in the year 1572, which, for ſome time, outſhone the biggeſt of the fixed ſtars, and in ſixteen months time, by degrees, vaniſhed quite away, and was never ſeen ſince. In the year 1640, the ſcholars of Kepler ſaw a ſtar in the right leg of Serpentarius, which, likewiſe, gradually diſappeared. Fabricius, in the year 1596, gives the firſt account of the ſtella mira, or wonderful ſtar, in the neck of the whale; which has been ſince found to appear and diſappear periodically, its period being ſeven revolutions in ſix years, but is never quite extinguiſhed. Several other new ſtars have been obſerved; as one by Hevelius in 1670; and another by Mr. Kirch, in 1689. Theſe new ſtars are generally obſerved in the galaxy, or milky-way.

As to the cauſes of this appearing and diſappearing of the fixed ſtars, Sir Iſaac Newton conjectures, that as it is poſſible our ſun may ſometimes receive an addition of fuel by the falling of a comet into it; ſo the ſudden appearance of ſome ſtars, which formerly were not viſible to us, may be owing to the falling of a comet upon them, and occaſioning an uncommon blaze and ſplender for ſome time: but that ſuch as appear and diſappear periodically, and increaſe by very ſlow degrees, ſeldom exceeding the ſtars of the third magnitude, may be ſuch as, having large portions of their ſurfaces obſcured by ſpots, may, by revolving round their axes, like the ſun, expoſe their lighter and darker parts to us ſucceſſively.

Nature and Diſtance of the fixed STARS. From the ſimilitude there appears to be between them and the ſun, it is generally ſuppoſed by philoſophers, that they are not placed in the heavens by way of ornament only, or to ſupply us with a faint light in the abſence of the moon; but that each of them is placed in the midſt of a ſyſtem of planetary worlds, and that it directs their motions, and ſupplies them with light and heat, in the ſame manner that the ſun does the ſeveral bodies of which our ſolar ſyſtem is compoſed; in ſhort, that they are ſo many ſuns, which no doubt, have planets moving regularly round them, though inviſible to us.

That this is not mere hypotheſis, will appear from the following arguments, drawn from the analogy they bear to our ſun: the ſun ſhines by its own native light, and ſo do the fixed ſtars: the ſun, at the

diſtance of the fixed ſtars, would appear no larger than a ſtar; none of our planets, at that diſtance, could be ſeen at all: is it not probable, therefore, that each of the fixed ſtars is a fixed ſun, ſurrounded by a ſyſtem of planets and comets, which may be again furniſhed with different numbers of ſatellites, or moons, though inviſible to us.

Beſides, as the number of ſtars is immenſely great, diſperſed through ſpaces of the univerſe, far beyond the reach of the beſt teleſcopes, and as God has made nothing in vain, it ſeems highly probable, that they ſeverally ſerve the purpoſes of light and heat for the planets of their ſyſtems; ſince nothing can be more abſurd, than to pretend, that myriads of unſeen ſtars were made to twinkle in the unknown regions of the univerſe.

That the fixed ſtars ſhine by their own light, is thus proved: when viewed through a teleſcope, they appear only as mere lucid points, deſtitute of all ſenſible magnitude, and conſequently muſt be at a vaſt diſtance; becauſe the ſatellites of Jupiter and Saturn, when viewed through a teleſcope, appear of very diſtinguiſhable magnitudes, and yet are inviſible to the naked eye.

Since, then, the fixed ſtars are at ſuch a vaſt diſtance, that the beſt teleſcope has no power to magnify them, and nevertheleſs ſhine with a very bright and ſparkling light, it is inferred that they muſt ſhine with their own proper and unborrowed light; becauſe, if their light was only borrowed, they would, like the ſatellites already mentioned, be inviſible to the naked eye.

The celebrated Huygens found the brighteſt and largeſt, and conſequently the neareſt of the fixed ſtars (viz. Sirius, or the dog-ſtar) to be in appearance 27664 times leſs than the ſun; and ſince the diſtances of objects are greater, as their apparent magnitudes are leſſer, the dog-ſtar muſt be diſtant from our earth 2000000000000, or above two millions of millions of Engliſh miles; which is ſo very great, that a cannon-ball, continuing in the ſame velocity it acquires when immediately diſcharged at the mouth of the cannon, would ſpend almoſt ſeven hundred thouſand years in paſſing through it: and it is very probable, that the fixed ſtars are equally diſtant from each other, as the neareſt of them is from our ſun; ſince, the better the teleſcopes we make uſe of, the more ſtars are ſeen.

Hence, it is very natural to conclude, that all the fixed ſtars are not placed at equal diſtances from us; but that they are every where interſperſed, at great diſtances beyond one another, throughout the univerſe; and that, probably, the different appearances which they make, in point of ſplendor and magnitude, may be rather owing to their various diſtances from us, than to any real difference in their magnitudes.

From what has been ſaid, concerning the number, nature, and diſtance, of the fixed ſtars, the hypotheſis of a plurality of worlds, wherein each fixed ſtar ſerves as a ſun to a ſyſtem of planets, ſeems rational, worthy a philoſopher, and greatly diſplays the wiſdom, and redounds to the glory, of the great Creator and Governor of the univerſe.

Apparent Motions of the fixed STARS. See the article ABERRATION.

Falling-STARS, *Stellæ Cadentes*, in meteorology, fiery meteors, which dart through the ſky, in form of a ſtar; being occaſioned by a nitro-ſulphureous matter, the common cauſe of all ſuch meteors. See AURORA BOREALIS.

STAR, in heraldry, a charge frequently borne on the ſhield, and the honourable ordinaries, in figure of a ſtar; which differs only from the mullet, in not being pierced as this laſt is.

STAR, is alſo a badge of honour, worn by the knights of the garter, bath, and thiſtle. See the article GARTER.

STAR, in pyrotechny, a compoſition of combuſtible matters, which being thrown aloft in the air, exhibits the appearance of a real ſtar.

STAR *of Bethlehem*, *Ornithogalum*, in botany. See the article ORNITHOGALUM.

STAR-APPLE, *Chryſophyllum*, in botany. See the article CHRYSOPHYLLUM.

STAR-BOARD, in the ſea-language, denotes the right-hand ſide of a ſhip: thus they ſay, ſtar-board the helm, or helm a ſtar-board, when he that conds would have the men at the helm, or ſteering-wheel, put the helm to the right ſide of the ſhip.

STAR-FORT, or REDOUBT, in fortification. See FORT and REDOUBT.

STAR-HYACINTH, *Scilla*, in botany. See the article SCILLA.

STAR-SHOT, a gelatinous ſubſtance frequently found in fields, and ſuppoſed by the vulgar, to have been produced by the meteor, called a falling-ſtar: but, in reality, is the half-digeſted food of herons, ſea-mews, and the like birds; for theſe birds, when ſhot, have been found, when dying, to diſgorge a ſubſtance of the ſame kind.

STAR-THISTLE, the Engliſh name of a ſpecies of centauria, called by ſome, calcitrapa. See the article CENTAURIA.

STAR-WORT, *Aſter*, in botany. See the article ASTER.

STARCH, a fecula, or ſediment, found at the bottom of veſſels wherein wheat has been ſteeped in water, of which fecula, after ſeparating the bran from it, by paſſing it through ſieves, they form a kind of loaves, which being dried in the ſun or an oven, is afterwards cut in little pieces and ſo ſold.

The beſt ſtarch is white, ſoft, and friable, and eaſily broken into powder. Such as require fine ſtarch, do not content themſelves, like the ſtarch-men, with refuſe wheat, but uſe the fineſt grain.

The proceſs is as follows: The grain, being well cleaned, is put to ferment in veſſels full of water,

water, which they expoſe to the ſun while in its greateſt heat, changing the water twice each day, for the ſpace of eight or twelve days, according to the ſeaſon. When the grain burſts eaſily under the finger, they judge it ſufficiently fermented. The fermentation perfected, and the grain thus ſoftened, it is put, handful by handful, into a canvas bag, to ſeparate the flour from the huſks, which is done by rubbing and beating it on a plank laid acroſs the mouth of an empty veſſel that is to receive the flour.

As the veſſels are filled with this liquid flour, there is ſeen ſwimming at top, reddiſh water, which is to be carefully ſcummed off from time to time, and clean water is to be put in its place, which, after ſtirring the whole together, is alſo to be ſtrained through a cloth or ſieve, and what is left behind put into the veſſel with new water, and expoſed to the ſun for ſome time.

As the ſediment thickens at the bottom, they drain off the water four or five times, by inclining the veſſel, but without paſſing it through the ſieve. What remains at bottom is the ſtarch, which they cut in pieces to get out, and leave it to dry in the ſun. When dry, it is laid up for uſe.

To uſe ſtarch, they take as much as is needed, and ſteep it in water over night, changing the water four or five times.

The ſtarchmen uſing the refuſe of wheat, only obſerve a part of theſe things in their proceſs, but their ſtarch falls far ſhort of this. Starch is uſed along with ſmalt, or ſtone-blue, to ſtiffen and clear linen; the powder thereof is alſo uſed to whiten and powder the hair. It is alſo uſed by the dyers to diſpoſe their ſtuffs to take colours the better,

STARLING, *Sternus*, in ornithology, a diſtinct genus of birds, of which there is only one known ſpecies, viz. the common ſtarling, much about the ſize of the black-bird, only that it ſtands more erect, and the body is ſlenderer.

Its general colour is black, variegated with grey ſpots, and the tips of the feathers of the neck and back are yellowiſh: the principal feathers of the wings and tail are brown, and have ſome yellow at their edges.

The ſtarling is frequent with us, and may be taught to imitate the human voice.

STARTING, in the manege. A horſe is ſaid to be ſtarting, ſkittiſh, or timorous, that takes every object he ſees to be otherwiſe than it is; whence he frequently ſtops, flies out, add ſtarts ſuddenly to one ſide, inſomuch that the rider cannot make him go forwards.

This fault is more common to geldings than ſtone-horſes, and theſe are moſt ſubject to it who have bad eyes, as well as thoſe that have been kept long in a ſtable without airing: but theſe laſt are eaſily cured of it. You ſhould not beat a ſtarting horſe in his conſternation, but get him to advance gently, and by fair means, to the object that alarms him.

STATERA ROMANA, or ſteel-yard, a name given to the Roman balance. See the article BALANCE.

STATICE, thrift, in botany, a genus of plants, whoſe flowers are collected in a head; the cup is ſcaly, and the corolla is funnel-ſhaped, conſiſting of five petals, which are narrow at their bottoms, and broad, patent, and obtuſe at their tops: the ſtamina are five ſubulated filaments, inſerted in the ungues of the corolla, and terminated with incumbent antheræ: there is no pericarpium; but the cup, which is conſtringed about the neck, and its limb expanded, contains the ſeeds, which are ſingle, very ſmall, and roundiſh.

The common thrift is propagated by parting its roots in autumn: it is often uſed for edgings in flower-gardens; but as it will not ſtand well above two years without replanting, and there being divers other plants more proper for that purpoſe, it is by many rejected.

This genus includes the limonium of Tournefort.

STATICS, that branch of mathematics which conſiders the motion of bodies ariſing from gravity.

Statics then is the doctrine, or theory, of motion, conſidered merely as ariſing from the weight of bodies; in which ſenſe it is diſtinguiſhed from mechanics, which is the application of ſtatics to machines, engines, &c. though it muſt be owned, that ſtatics and mechanics are frequently confounded. See the articles MECHANICS and MOTION.

STATICS, *Statici*, in medicine, a kind of epileptics, or perſons ſeized with an epileptic fit; during which, they contemplate ſome ſtrong and lively idea, whereby they are diſtinguiſhed from cataleptics, or perſons ſeized with a catalepſy.

STATION, in geometry, ſurveying, &c. a place pitched upon to make an obſervation, take an angle, or the like.

STATIONARY, in aſtronomy, ſignifies the appearance of a planet, when it ſeems to remain immoveable on the ſame point of the zodiac for ſeveral days.

As the earth, whence we view the motions of the planets, is out of the center of their orbits, the planets appear to proceed irregularly; being ſometimes ſeen to go forwards, that is, from weſt to eaſt, which is called the direction; ſometimes to go backwards, or from eaſt to weſt, which is called the retrogradation.

Now, between theſe two ſtates there muſt be an intermediate one, wherein the planet neither appears to go backwards nor forwards, but to ſtand ſtill, and keep the ſame place in her orbit, which is called her ſtation; and this will happen, when the line that joins the earth's and planet's center is conſtantly directed

directed to the same point in the heavens; that is, when it keeps parallel to itself. For all right-lines, drawn from any part of the earth's orbit, parallel to one another, do all point to the same star; the distance of these lines being insensible, in comparison of that of the fixed stars.

Saturn is seen stationary at the distance of somewhat more than a quadrant from the sun; Jupiter at the distance of fifty-two degrees; and Mars at a much greater distance.

Saturn is stationary eight days, Jupiter four, Mars two, Venus one and an half, and Mercury an half, though the several stations are not always equal.

STATIONARY FEVER, a peculiar kind of fever, adapted and owing to some general constitution of the air and seasons.

Sydenham observes, that there are certain general constitutions of years, which owe their origin neither to heat, cold, dryness, nor moisture, but rather depend upon a certain secret and inexplicable alteration in the bowels of the earth, whence the air becomes impregnated with such kinds of effluvia, as subject the human body to peculiar distempers, so long as that kind of constitution prevails, which after a certain course of years declines, and gives way to another.

Each of these general constitutions is attended with its own proper and peculiar kind of fever, which never appears in any other; and this is thence called a stationary fever.

STATUARY, *Statuaria*, a branch of sculpture, employed in the making of statues.

STATUE, *Statua*, is defined to be a piece of sculpture in full relievo, representing a human figure.

Daviler more scientifically defines statue a representation, in high relievo and insulate, of some person distinguished by his birth, merit, or great actions, placed as an ornament in a fine building, or exposed in a public place to preserve the memory of his worth. In strictness, the term statue is only applied to figures on foot, the word being formed from *statura*, the size of the body.

Statues are formed with the chissel, of several matters, as stone, marble, plaster, &c. They are also cast of various kinds of metal, particularly gold, silver, brass, and lead. For the method of casting statues, see FOUNDERY *of Statues*.

Statues are usually distinguished into four general kinds: the first are those less than the life, of which kind we have several statues of great men, of kings, and of gods themselves; the second are those equal to the life, in which manner it was that the ancients, at the public expense, used to make statues of persons eminent for virtue, learning, or the services they had done: the third, those that exceed the life, among which, those which surpassed the life once and a half, were for kings and emperors, and those double the life, for heroes: the fourth kind were those that exceeded the life twice, thrice, and even more, and were called colossuses. See COLOSSUS.

Every statue, resembling the person it is intended to represent, is called *statua iconica*. Statues acquire various other denominations. Thus,

1. Allegorical statue, is that which, under a human figure, or other symbol, represents something of another kind, as a part of the earth, a season, age, element, temperament, hour, &c.

2. Curule statues, are those which are represented in chariots drawn by bigæ, or quadrigæ, that is, by two or four horses; of which kind there were several in the circuses, hippodromes, &c. or in cars, as we see some, with triumphal arches, on antique medals.

3. Equestrian statue, that which represents some illustrious person on horse-back, as that famous one of Marcus Aurelius, at Rome; that of king Charles the first, at Charing-Cross; king George the second, in Leicester-square, &c.

4. Greek statue, denotes a figure that is naked and antique; it being in this manner the Greeks re-represented their deities, athletæ of the Olympic games, and heroes: the statues of heroes were particularly called Achillean statues, by reason of the great number of figures of that prince in most of the cities of Greece.

5. Hydraulic statue, is any figure placed as an ornament of a fountain or grotto, or that does the office of a jet d'eau, a cock, spout, or the like, by any of its parts, or by any attribute it holds; the like is to be understood of any animal serving for the same use.

6. Pedestrian statue, a statue standing on foot; as that of king Charles the second, in the Royal-Exchange; and of king James the second, in the Privy-Gardens.

7. Roman statue, is an appellation given to such as are cloathed, and which receive various names from their various dresses: those of emperors, with long gowns over their armour, were called, *statuæ paludatæ:* those of captains and cavaliers, with coats of arms, *thoracatæ:* those of soldiers, with cuirasses, *loricatæ:* those of senators and augurs, *trabeatæ:* those of magistrates, with long robes, *togatæ:* those of the people, with a plain tunica, *tunicatæ:* and, lastly, those of women, with long trains, *stolatæ*.

The Romans had another division of statues into divine, which were those consecrated to the gods, as Jupiter, Mars, Apollo, &c. Heroes, which were those of the demi-gods, as Hercules, &c. and Augusti, which were those of the emperors, as those two of Cæsar and Augustus, under the portico of the capitol.

In repairing a statue cast in a mould, they touch it up with a chissel, graver, or other instrument, to

to finish the places which have not come well off: they also clear off the barb, and what is redundant in the joints and projectures.

STATURE, the size or height of a man.

STATUTE, *Statutum*, in its general sense, signifies a law, ordinance, decree, &c.

STATUTE, is also used for a short instrument in writing, termed statute-merchant, or statute-staple, which are in the nature of bonds, and called by the name statutes, on account of their being made pursuant to the forms prescribed by certain statutes, whereby it is directed, before what persons, and how they are to be made.

STATUTE-SESSIONS, is taken for a meeting of constables and house-keepers in some hundreds, by custom, for the debating of differences between masters and servants, the rating of servants wages, and bestowing persons in service, &c.

STAVERS, or STAGGERS, among farriers, a giddiness in a horse's head, which ends in madness. This disease is frequently occasioned by turning out a horse to grass too soon, before well cold, where, by hanging down his head to feed, bad vapours and humours are generated, which oppressing the brain, are the proximate cause of this disease. Sometimes it comes by over exercise in hot weather, which inflames the blood, &c. and sometimes by noisome smells in the stable, excessive eating, &c. The signs of it are dimness of sight, reeling and staggering, watery eyes, &c. At length, for perfect pain, he beats his head against the wall, thrusts it into the litter, rises and lies down with fury, &c. For the cure of this distemper there are various prescriptions, one of which is, first to bleed the horse, then to dissolve the quantity of a hazle-nut of sweet butter in a saucer full of wine; then taking some lint, or fine flax, dip it in the mixture and stop his ears with it, and stitch them for twelve hours: some boil an ounce and a half of bitter-almonds, two drams of ox-gall, half a penny worth of black-hellebore made into powder, grains of castoreum, vinegar and varnish, of each five drams; which they boil and strain, and then put into his ears.

STAVESACRE, in botany, the English name for a species of delphinium. See the article DELPHINIUM.

It grows in shady places in the southern parts of Europe, and is cultivated in our gardens for the sake of its flowers, which are like those of the larkspur.

STAY, in the sea-language, a big strong rope, fastened to the top of one mast, and to the foot of that next before it, towards the prow, serving to keep it firm, and prevent its falling aftwards or towards the poop.

All masts, top-masts, and flag-staves, have their stays, except the sprit-sail top-masts. That of the mast is called the main-stay. The main-mast, fore-mast, and those belonging to them, have also back-stays to prevent their pitching forwards or overboard, as going on either side of her.

To stay a ship, or to bring her on the stays, is to manage her tackle and sails so that she cannot make any way forwards; which is done in order to her tacking about.

STEADY, a word of command, at sea, for the man at the helm to keep the ship steady in her course, and not to make angles (or yaws, as they call them) in and out.

STEATOMA, a kind of encysted tumour, consisting of a matter like suet or lard, soft, without pain, and without discolouring the skin.

STEEL, a kind of iron refined and purified by the fire with other ingredients.

Steel, of all other metals, is that susceptible of the greatest degree of hardness when well tempered, whence its great use in the making of tools and instruments of all kinds. Mr. Cramer observes, that the difference between iron and steel is, that the latter being much harder, will not yield to the hammer, but is brittle instead of being ductile, and resists the file. Malleable iron grows rigid by being simply extinguished in cold water, but it yet retains a considerable degree of ductility in the cold, and may be extended in all dimensions with the hammer. Steel, however, if heated again, and cooled by slow degrees, may be filed and extended more or less by the hammer. But there are many degrees in the hardening of steel; for if it has been extremely red hot, and then quenched in cold water in motion, it becomes greatly harder than if it had been but moderately red hot, and had been quenched in warm water. Steel is also of a darker colour than iron, and the surface of it, when broken, appears to consist of smaller granulated, or even striated, particles than the iron it was made of. Mr. Cramer further observes, that the method of making steel out of iron is either by cementation or by fusion. That by cementation may be performed in the following manner: choose some bars of pure iron, not too thick, and quite free from heterogeneous matter, the flexibleness of it, both when hot and cold, being a very good sign thereof: prepare a cement of charcoal-dust, moderately pulverized, one part: or of charcoal-dust two parts, bones, horns, or hair of animals, burnt to a blackness, in a close vessel and in a gentle fire, and afterwards reduced to a powder, one part; wood-ashes, half a part: mix them together; prepare an earthen cylindrical vessel, two or three inches higher than the bars are long; put into the bottom of this vessel the cement, prepared as before directed, so that being gently pressed down it may cover the bottom of the vessel an inch and half deep; place then the bars perpendicularly, so that they may be every where about an inch from the sides of the vessel and from each other; fill the interstices with the same cement,

cement, and cover alſo the bars with it, ſo that the veſſel may be quite full; next cover it with a tile, and ſtop the joints with thin lute: put this veſſel into a furnace, and keep it moderately but equally red hot, for ſix or ten hours together; when this is over, take the red hot bars out and dip them in cold water, they will then be brittle, and turned to ſteel. See CÆMENTATION.

The method of making ſteel by fuſion is as follows: take of iron-ore, or of unmalleable iron, of the firſt fuſion, divide it into ſmall parcels, and put them into a bed made of charcoal-duſt, in a ſmith's forge: let the quantity of iron be but ſmall for the experiment; put to it, as a defenſitive menſtruum, ſome of the vitreſcent ſcoriæ of ſand, or ſtones of the ſame nature; then put upon them a quantity of charcoal; light this, and admit only a gentle blaſt of the bellows, that the ſcoræ and the metal may both melt regularly: when this has been ſome time kept in fuſion, take it out, and divide it into two parts, which make red hot, and hammer into long bars: finally, beat them red hot, and plunge them into cold water, and they will be found to be ſteel, ſo very hard as not to be fileable, and ſo brittle as to break aſunder when ſtruck with conſiderable force.

A bar of iron, when converted into ſteel, is not equally ſo converted in all its parts; the fire has always acted more ſtrongly upon its ſurface than on its central parts, and it is therefore more perfect ſteel there than in its inner parts; but a perfection in the operation is not neceſſary to the ſteel's being good and uſeful, for the whole bar is often very good ſteel, as are alſo many bars made at the ſame time, yet all, perhaps, differently affected.

If the compoſition which is to convert the iron into ſteel be too ſtrong, or if the fire be too violent, or the matter continued too long in it, in all theſe caſes the ſteel will be over made. The way to meliorate ſuch ſteel as this, muſt be to diveſt it of part of its ſalts and its ſulphur, but particularly the latter; and M. Reaumur found, that, burying the bars of ſuch ſteel in lime, or any other alkaline ſubſtance that would readily abſorb the ſulphurs, and placing it for a proper time in the fire, it would be in a manner decompoſed again, and come out a very good and perfect ſteel.

By this management ſteel may again be converted or reduced to its primitive iron, and a body of any middle degree between ſteel and iron may be produced by ſtopping the proceſs at different points of time, or continuing it till all the adventitious ſalts and ſulphurs are drawn off or abſorbed.

Annealing or nealing of ſteel, is by ſome uſed for the ſoftening it, in order to make it work the eaſier, which is uſually done by giving it a blood-red heat in the fire, and then taking it out and letting it cool of itſelf: ſome have pretended to ſecrets in annealing, by which they could bring down iron or ſteel to the temper of lead: this was done by often heating the metal in melting lead, and letting it cool again out of the lead. But this method is found by Moxon to have no other effect than what it had from the former. Steel may, indeed, be made a little ſofter than in the common way, by covering it with coarſe powder of cow-horn or hoofs; thus incloſing it in a loam, heating the whole in a wood-fire till it be red hot, and then leaving the fire to go out of itſelf, and the ſteel to cool.

STEELYARD, *Statera Romana*. See the article BALLANCE.

STEEPLE, an appendage erected generally on the weſtern end of a church, to hold the bells. Steeples are denominated from their form, either ſpires or towers; the firſt are ſuch as aſcend continually diminiſhing either conically or pyramidally. The latter are mere parallelopipeds. See SPIRE and TOWER.

STEERAGE, on board a ſhip, that part of the ſhip next below the quarter-deck, before the bulk-head of the great cabbin, where the ſteerſman ſtands in moſt ſhips of war.

STEERING, in navigation, the directing a veſſel from one place to another by means of the helm and rudder. He is held the beſt ſteerſman who cauſes the leaſt motion in putting the helm over to and again, and who beſt keeps the ſhip from making yaws, that is, from running in and out. There are three methods of ſteering, 1. By any mark on the land, ſo as to keep the ſhip even by it. 2. By the compaſs, which is by keeping the ſhip's head on ſuch a rhumb or point of the compaſs, as beſt leads to port. 3. To ſteer as one is bidden or conned, which, in a great ſhip, is the duty of him that is taking his turn at the helm.

STEEVE, on board a ſhip. The ſeamen ſay the bowſprit or the beak-head of a ſhip ſteeves, when it ſtands too upright, or not ſtraight enough forward.

STEGANOGRAPHY, the art of ſecret writing, or of writing in cyphers, known only to the perſons correſponding.

STELLARA, in botany, a genus of plants, whoſe flower conſiſts of a pentaphyllous cup, with five bipartite, plane, oblong, withering petals; the ſtamina conſiſts of ten ſlender filaments, topped with roundiſh antheræ; the fruit is an ovate, cloſe, unilocular capſule, opening with ſix valves, and contains a number of compreſſed roundiſh ſeeds. This genus includes the alſine of Tournefort.

STELLATE-PLANTS, among botaniſts, are thoſe whoſe leaves are placed in the form of a ſtar at certain joints or diſtances on the ſtalks, ſuch are madder, clivers, &c.

STELLERA, in botany, a genus of plants, whoſe flower is monopetalous, funnel-ſhaped, and perſiſtent; the tube is long and ſlender, and the limb

limb is divided into four or five ovate lobes; the filaments are eight or ten in number, and very ſhort, and topped with oblong antheræ; there is neither pericarpium nor calyx; the ſeed is ſingle, beaked, and ſhining.

STEM, in botany, that part of a plant ariſing immediately from the root, and which ſuſtains the branches, leaves, flowers, and fruit. See STALK.

STEM *of a Ship*, that main piece of timber which comes bending from the keel below, where it is ſcarfed, as they call it; that is, pieced in; and riſes compaſſing right before the forecaſtle. This ſtem it is, which guides the rake of the ſhip, and all the but-ends of the planks are fixed into it.

Falſe ſtem, in a ſhip, is that fixed before the right one, where that is made too flat for the ſhip to keep the wind well.

STEMODIA, in botany, a genus of plants, whoſe flower is monopetalous and irregular; the tube is the length of the cup, and the limb is erect and almoſt bilabiated; the upper lip is ovate and intire, and the under one is divided into three roundiſh equal parts; the ſtamina are four almoſt equal filaments, which are terminated with eight antheræ: the fruit is an ovate, oblong, bilocular capſule, containing a great many globoſe ſeeds.

STEMPLES, in mining, croſs bars of wood in the ſhafts which are ſunk to mines. In many places the way is to ſink a perpendicular hole or ſhaft, the ſides of which they ſtrengthen from top to bottom with wood-work, to prevent the earth from falling in; the tranſverſe pieces of wood uſed for this purpoſe, they call ſtemples, and by means of theſe the miners, in ſome places, deſcend without uſing any rope, catching hold of theſe with their hands and feet.

STENTOROPHONIC TUBE, a ſpeaking-trumpet, thus called from Stentor, a perſon mentioned by Homer.

STERCULIA, in botany, a genus of plants, producing male and female flowers, which are apetalous; the male flower conſiſts of a large coriaceous cup, divided into five lanceolated ſegments, with fifteen very ſhort filaments joined in a column, and topped with ovate antheræ; the cup of the female flower is the ſame as the male, and the fruit is depreſſed and orbiculated, containing a great number of oval kernels.

STEREOGRAPHIC PROJECTION, is the projection of the circles of the ſphere on the plane of ſome one great circle, the eye being placed in the pole of that circle. The method and practice of this projection in all the principal places, viz. on the planes of the meridian, equinoctial, and horizon, have already been given under the articles MAP and PROJECTION.

STEREOGRAPHY, the art of drawing the forms and figures of the ſolids upon a plane.

STEREOMETRY, *στερεομετρία*, that part of geometry which teaches how to meaſure ſolid bodies, i. e. to find the ſolidity or ſolid content of bodies, as globes, cylinders, cubes, veſſels, ſhips, &c.

STEREOTOMY, the art or act of cutting ſolids, or making ſections thereof, as walls or other members in the profiles of architecture.

STERILITY, the quality of a thing that is barren, in oppoſition to fertility.

STERLING, a term frequent in Britiſh commerce. A pound, ſhilling, or penny ſterling, ſignifies as much as a pound, ſhilling, or penny, of lawful money of Great-Britain, as ſettled by authority.

STERN *of a Ship*, uſually denotes all the hindermoſt part of her, but properly it is only the outmoſt part abaft.

STERN-FAST, denotes ſome faſtenings of ropes, &c. behind the ſtern of a ſhip, to which a cable or hawſer may be brought or fixed, in order to hold her ſtern to a wharf, &c.

STERN-POST, a great timber let into the keel at the ſtern of a ſhip, ſomewhat ſloping, into which are faſtened the after-planks; and on this poſt, by its pintle and gudgeons, hangs the rudder.

STERNOHYOIDÆUS, in anatomy, a long, thin, flat muſcle, fixed by its lower extremity in the ſuperior and lateral part of the inner or poſterior ſide of the ſternum, in the poſterior part of the ſternal extremity of the clavicle, in the tranſverſe ligament which connects theſe two bones, and in the inner or backſide of the cartilage of the firſt rib; from hence it runs up to the foreſide of the aſpera arteria, joins its fellow by a membrane which forms a ſort of linea alba, and is inſerted laterally in the lower edge of the baſis of the os hyoides.

STERNUM, in anatomy, the breaſt-bone, being a cartilaginous ſort of bone which compoſes the forepart of the breaſt, and into which the ribs are fitted.

In adults this bone is often ſingle, but ſometimes it has two, ſometimes three, pieces concurring to form it. Its ſubſtance is fungous and ſpungy; its upper part is called the manubrium or handle, and in this there is on each ſide a cavity for the articulation of the clavicles. In the middle it is narrow, and broad at the lower part. To this alſo there adheres a cartilage, called from its figure cartilago enſiformis, or xiphoides. This is uſually ſingle; ſometimes it is bifurcated, and not unfrequently bony throughout; and on each ſide of the ſternum there are ſeven cavities for the articulation of the ſeven true ribs.

STERNUTATION. See SNEEZING.

STERNUTATIVE, or STERNUTATORY, a medicine proper to produce ſneezing.

Sternutatives are of two kinds, gentle and violent. Of the firſt kind are betony, ſage, marjorum, tobacco,

bacco, and the whole fashionable tribe of snuffs. Of the latter kind are euphorbium, white hellebore, pellitory, &c. Sternutatives operate by their sharp pungent parts, vellicating the inner membrane of the nose, which is exceeding sensible, and occasioning the serous matter contained in the glands of the nose and in several sinuses situated in the base of the cranium and the os frontis, to be expelled.

STEW, a small kind of fish-pond, the peculiar office of which is to maintain fish, and keep them in readiness for the daily use of a family, &c. The fish bred in the large ponds, are drawn out and put in here. For two large ponds of three or four acres a-piece, it is adviseable to have four stews, each two rods wide, and three long. The stews are usually in gardens, or at least near the house, to be more handy, and the better looked to. The method of making them is to carry the bottom in a continued decline from one end, with a mouth to favour the drawing with a net. See the article FISH-POND.

STEWS, or STUES, were also places anciently permitted in England to women of professed incontinency, for the proffer of their bodies to all comers. These were under particular rules and laws of discipline, appointed by the lord of the manor.

STEWARD, an officer appointed in another's stead or place, and always taken for a principal officer within his jurisdiction. Of these there are various kinds. The greatest officer under the crown is the lord high steward of England, an office that was anciently the inheritance of the earls of Leicester, till forfeited by Simon de Mountfort, to king Henry III. But the power of this officer is so very great, that it has not been judged safe to trust it any longer in the hands of a subject, excepting only *pro hac vice*, occasionally: as to officiate at a coronation, at the arraignment of a nobleman for high-treason, or the like. During his office, the steward bears a white staff in his hand, and the trial, &c. ended, he breaks the staff, and with it his commission expires. There is likewise a lord steward of the king's household, who is the chief officer of the king's court, has the care of the king's house, and authority over all the officers and servants of the household, except such as belong to the chapel, chamber, and stable. See the article HOUSHOLD.

There is also a steward of the Marshalsea, who has judicial authority. And in most corporations, and all houses of quality in the kingdom, there is an officer of the name and authority of a steward. The steward of a ship is he who receives all the victuals from the purser, and is to see it well stowed in the hold; all things of that nature belonging to the ship's use are in his custody; he looks after the bread, and distributes out the several messes of victuals in the ship; he hath an apartment for himself in the hold, which is called the steward's room.

STEWARTIA, in botany, a genus of plants, whose flower consists of five large oval patent petals, with a great number of slender filaments, joining towards their base in a cylindric form, and terminated with roundish incumbent antheræ; the fruit is a dry apple, having five lobes and five cells, which contain in each an ovate compressed seed.

STIGMA, in botany, the extreme part of the pistillum, or female organ of generation in flowers; it is generally covered with a moisture for breaking the farina or male dust, which it dissolves, and is supposed to discharge a sufficient quantity of it to impregnate the germen below. See the articles BOTANY, GENERATION, PISTILLUM, &c.

STIGMATA, in natural history, the apertures in different parts of the bodies of insects, communicating with the tracheæ, or air-vessels, and serving for the office of respiration.

Nature has given to these minute animals a much larger number of tracheæ and bronchia than to us; all the two-winged and four-winged flies, which have a single or undivided corcelet, to which their legs are all fixed, have also four stigmata in that corcelet, two on each side; they have them also on the rings of their body, but those on the corcelet are the most considerable. Of the four on the corcelet, the two anterior ones are usually the largest; these, as well as the posterior ones, are oblong, and placed obliquely to the length of the body.

The colour of the stigmata frequently differs from that of the corcelet; some are yellowish, others of a coffee-colour, or some degrees of a fallow-colour, in flies whose corcelet is brown, black, or blue.

Flies have, beside these, several stigmata also in the rings of their bodies, perhaps in every one of them: these stigmata are not like those of the corcelet, but are round, usually a little eminent above the rest of the surface, and resembling a pin's head.

STIL DE GRAIN, in the colour-trade, the name of a composition used for painting in oil or water, and is made by a decoction of the lycium or avignon-berry in alum-water, which is mixed with witing into a paste, and formed into twisted sticks.

It ought to be chosen of a fine gold-yellow, very fine, tender, and friable, and free from dirt.

STILE, *Stilus*. See the article STYLE.

STILLATITIOUS OILS, such as are produced by distillation, in opposition to those got by infusion, expression, &c.

STILL-BOTTOMS, in the distillery, a name given by the traders to what remains in the still after the working the wash into low wines.

These bottoms are procured in the greatest quantity from the malt-wash, and are of so much value to the distiller, in the fattening of hogs, &c. that he often finds them one of the most valuable articles of the business. They might also, as Dr. Shaw observes,

obſerves, be put to other uſes, ſuch as the affording a large proportion of acid ſpirit, an oil, a fuel, and a fixed ſalt, and with ſome addreſs and good management, a vinegar and tartar. Another advantageous uſe of them, is the adding them to the next brewing of the malt for more ſpirit: the increaſe of the produce from this is more than is eaſily conceived. It alſo more readily diſpoſes the new waſh to ferment, and gives the ſpirit a vinoſity, that it cannot have without it; the proportion in this caſe muſt never exceed that of a fifth or ſixth part of the whole quantity of liquor employed.

STILL-HOUSE. The Dutch have much the advantage of us in the ſtructure of their ſtill houſes. The general rules in building thoſe houſes, according to Shaw, ſhould be ſuch as follow:

The firſt caution is, to lay the floor aſlope, not flat, where any wet work is to be performed. It ſhould alſo be well flagged, with broad ſtones, ſo that no wet be detained in the crevices, but all may run off, and be let out at the drains made at the bottom and ſides. The ſtills ſhould be placed abreaſt on that ſide of the ſtill-houſe to which the floor has its current. Fronting the ſtills, and adjoining to the back of the wall, ſhould be a ſtage for holding the fermenting backs, and theſe being placed at a proper height, may empty themſelves by means of a cock and a canal into the ſtills, which are thus charged with very little trouble. Near this ſet of fermenting backs ſhould be placed a pump or two, that may readily ſupply them with water, by means of a trunk, or canal, leading to each back; under the pavement adjoining to the ſtills, ſhould be a kind of cellar, wherein to lodge the receivers, each of which ſhould be furniſhed with its pump, to raiſe the low wines into the ſtill for rectification; and through this cellar the refuſe waſh, or ſtill-bottoms, ſhould be diſcharged by means of a hoſe, or other contrivance.

STIMULATING, *Stimulans*, a property in angular or ſharp bodies, whereby they vellicate and cauſe vibrations and inflections of the fibres of the nerves, and a greater derivation of nervous fluid into the parts affected.

Stimulants produce pain, heat, redneſs, &c. They may be reduced to violent penetrating depilatories, gentle ſinapiſms, veſicatories, and cauſtics. See SINAPISM, VESICATORY, &c.

STING, *Aculeus*, an apparatus in the body of certain inſects, in form of a little ſpear, ſerving them as a weapon of offence. The ſting of a bee or waſp, is a curious piece of mechaniſm, it conſiſts of a hollow tube, at the root of which there is a bag full of ſharp, penetrating juice, which in ſtinging, is injected into the fleſh, through the tube: within the tube, Mr. Durham has obſerved, there lie two ſharp ſmall bearded ſpears: in the ſting of a waſp, he told eight beards on the ſide of each ſpear, ſomewhat like the beards of fiſh-hooks. One of theſe ſpears in the ſting, or ſheath, lies with its point a little before the other, to be ready, as ſhould ſeem, to be firſt darted into the fleſh, which once fixed by means of its foremoſt beard, the other then ſtrikes too, and ſo they alternately pierce deeper and deeper, their beards taking more and more hold in the fleſh; after which the ſheath or ſting follows to convey the poiſon into the wound, which that it may pierce the better, is drawn into a point with a ſmall ſlit below that point for the two ſpears to come out at. By means of theſe beards it is, that the animal is forced to leave its ſting behind it, when diſturbed, becauſe it can have no time to withdraw the ſpears into the ſcabbard.

STINK, or STENCH, a diſagreeable ſmell exhaling from a corrupted, or other body, and which is prejudicial to the noſe and brain.

STIPA, in botany, a genus of frumentaceous plants; the flower is a bivalvular glume; the top of the outer valve is terminated with a very long ariſta or awn; the ſtamina are three capillary filaments, topped with linear antheræ; the ſeed is ſingle, oblong, and cloſed in the chaff.

STIPEND, *Stipendium*, among the Romans, ſignified the ſame with tribute; and hence ſtipendiarii were the ſame with tributarii.

STIPULATION, in the civil law, the act of ſtipulating, that is, of treating and concluding terms and conditions to be inſerted in a contract.

STIRRUP, or STIRROP, in the manege, a reſt, or ſupport for the horſeman's foot, ſerving to keep him firm in his ſeat, and to enable him to mount.

STIRRUP *of a Ship*, a piece of timber put upon a ſhip's keel, when ſome of her keel happens to be beaten off, and they cannot come conveniently to put or fit in a new piece; then they patch in a piece of timber, and bind it on with an iron, which goes under the ſhip's keel, and comes up on each ſide of the ſhip, where it is nailed ſtrongly with ſpikes, and this they call a ſtirrup.

STOAKED, on board a ſhip. When the water in the bottom cannot come to the well of the pump, they ſay, the ſhip is a-ſtoak, or ſtoaked: ſo they ſay alſo, the limber-holes are ſtoaked, when the water cannot paſs through them; and the pump is ſtoaked, when ſomething is got into it, which choaks it up, ſo that it will not work.

STOCK, in gardening, the ſtem or trunk of a tree: it is alſo a term uſed for thoſe young plants which are intended to be grafted or inoculated.

STOCK-GILLIFLOWERS, *Cheiranthus*, in botany; of theſe there are ſeveral very beautiful ſpecies raiſed in gardens, and known by the names of the ten-weeks ſtock, the queen-ſtock, the Brumpton-ſtock, and the white ſtock; of the former there are four varieties, producing white, red, purple, and ſtriped flowers, with ſeveral other ſorts; thoſe with double flowers are held moſt in eſteem, tho' the ſingle flowered ſtocks muſt be noticed, for it is

from them the ſeeds are produced by which the double ones are obtained. The ſingle flowers of all the ſorts are tetrapetalous and cruciform, and the fruit is a long compreſſed pod, with two cells, which contain a number of compreſſed ſeeds, having membranaceous margins. The ten-weeks ſtock ſeed ſhould be ſown in February for the firſt crop, but will require a little heat to forward them, and in April the plants may be removed to where they are intended to remain; the ſecond crop ſhould be ſown in the latter end of March, in the places where they are deſigned to blow: this ſort flowers the ſame year. The queen-ſtock produces its flowers in May and June the ſecond year after ſowing; this ſort ſhould be ſown in March, and afterwards tranſplanted into beds, at about ſix or ſeven inches aſunder, and in Auguſt may be removed to where they are intended to flower. The Brumpton-ſtock is an exceeding fine flower when blown in perfection, but is very apt to be deſtroyed in ſevere winters, unleſs properly protected. The ſeaſon for ſowing this ſort is in April, though it may not be amiſs to ſow ſome of the ſeed in March. The white and purple ſtocks may be managed in the ſame manner as the queen-ſtock.

The beſt method to obtain double flowers from any of the ſorts is, not to ſow the ſeed until it is two years old, or, if it will vegetate at three years, there will be the greater chance.

To the ſtocks, botaniſts join the wall-flower, which are called by one general name, cheiranthus. See CHEIRANTHUS and WALL-FLOWER.

Dwarf-STOCK, *Heſperis*, in botany. See HESPERIS.

STOCK-JOBBING, the art or myſtery of trafficing in the public ſtocks or funds. If ſtock-jobbers make any contract for the ſale of ſtock, when they are not actually poſſeſſed of, or intitled to the ſame, thoſe contracts will be deemed void. Likewiſe the parties ſo agreeing to ſell, are liable to a penalty of 500 l. The time of tendering ſtock ſold, is held to be the laſt hour of the day on which it was to be transferred, and then an actual transfer is not neceſſary, unleſs the perſon to whom it ought to be made be at the place and time ready to receive the ſame.

STOCK-FISH, or STOCK FISCH, in commerce, a kind of dried ſalted-fiſh, of a greyiſh aſh-colour, and the belly ſomewhat whiter, being only cod-fiſh cured in a particular manner, which makes it neceſſary to beat it with ſticks before it is fit for dreſſing.

STOCKING, that part of the cloathing of the leg and foot which immediately covers their nudity, and ſcreens them from the cold, &c. Anciently, the only ſtockings in uſe were made of cloth, or of milled ſtuffs ſewed together; but ſince the invention of knitting and weaving ſtockings of ſilk, wool, cotton, thread, &c. the uſe of cloth ſtockings is quite out of doors. The modern ſtockings, whether woven or knit, are a kind of plexuſes, formed of an infinite number of little knots called ſtitches, loops, or meſhes, intermingled in one another.

Knit ſtockings are wrought with needles made of poliſhed iron or braſs wire, which interweave the threads, and form the meſhes the ſtockings conſiſts of. This operation is called knitting, the invention whereof is commonly attributed to the Scots, on this ground, that the firſt works of this kind came from thence. It is added, that it was on this account that the company of ſtocking-knitters eſtabliſhed at Paris, in 1527, took for their patron St. Fiacre, who is ſaid to be the ſon of a king of Scotland. Woven ſtockings are ordinarily very fine; they are manufactured on a frame, or machine of poliſhed iron, the ſtructure and apparatus where of is exceedingly ingenious.

The Engliſh and French have greatly conteſted the honour of the invention of the ſtocking-loom; but we are aſſured, whatever pretenſions the French claim to this invention, that the ſame was certainly deviſed by William Lee, of St. John's college, Cambridge, in the year 1589, though it is true, that he firſt made it public in France, after deſpairing of ſucceſs in his own country.

STOCKS, among ſhip-carpenters, a frame of timber, and great poſts made aſhore, to build pinnaces, ketches, boats, and ſuch ſmall craft, and ſometimes ſmall frigates. Hence we ſay, a ſhip is on the ſtocks, when ſhe is building.

STOCKS, *Cippus*, a wooden machine to put the legs of offenders in, for the ſecuring of diſorderly perſons, and by the way of puniſhment in divers caſes, ordained by ſtatute, &c.

STOEBE, in botany, a genus of plants, whoſe flower is compoſed of a number of monopetalous hermaphrodite corollulæ, which are divided into five ſegments at the limb, and contained in one common, roundiſh, imbricated cup; there is no pericarpium, but the ſeeds, which are oblong and crowned with a long feathery down, are contained in the cup.

STOECHAS, in botany, Tournefort's name for a kind of Lavender, now comprehended by Linnæus among the lavenders. See the article LAVANDULA.

STOICS, a ſect of ancient philoſophers, the followers of Zeno, thus called from the Greek στοα, which ſignifies a porch or portico, in regard Zeno uſed to teach under a portico, or piazza. It was the common fault of the Stoics to introduce abundance of ſubtilty and dryneſs into their diſputations, either by word of mouth, or in writing. They ſeemed as carefully to avoid all beauty of ſtyle, as depravity of morals. Chryſippus, who was one of the Stoics, did no great honour to his ſect, and could only diſgrace it. He believed the gods periſh-

able,

able, and maintained, that they would actually periſh in the general conflagration. He allowed the moſt notorious and moſt abominable inceſts, and admitted the community of wives among ſages.

To the praiſe of the ſtoics, in general, it muſt, however, be confeſſed, that, leſs intent than other philoſophers upon frivolous and often dangerous ſpeculations, they devoted their ſtudies to the clearing up of thoſe great principles of morality which are the firmeſt ſupports of ſociety; but the dryneſs and ſtiffneſs that prevailed in their writings, as well as in their manners, diſguſted moſt of their readers, and abundantly leſſened their utility.

Zeno's chief followers, among the Greeks, were Lucippus, Cleanthus, Chryſippus, Diogenes Babylonius, Antipater, Panætius, Poſſidonius, and Epictetus. Among the Romans, Cato, Varro, Cicero, Seneca, the emperor Antoninus, &c.

The Stoics cultivated logic, phyſics, metaphyſics, &c. but eſpecially ethics. The principal of their dogmata, of the former kinds, are, that there are certain catalepſias, or comprehenſions, called alſo κοιναις εννοιαις, innate ideas, or principles naturally found in the mind: that God is the ſeminal cauſe of the univerſe, and with the Platoniſts, that the world is an animal, by reaſon of God's inhabiting and informing every part thereof: that nature is an artificial fire, tending to generation: and that the world is at laſt to be deſtroyed by a conflagration.

As for the morality of the Stoics, it was couched much in paradoxes; as, that a wiſe man is void of all paſſions, or perturbation of mind; that pain is no real evil, but that a wiſe man is always happy in the midſt of torture, is always the ſame, and is always joyful; that there is none elſe free; that none elſe ought to be eſteemed king, magiſtrate, poet, or philoſopher; that all wiſe men are great men; that they are the only friends or lovers; that nothing can happen to them beyond their expectations; that all virtues are inſenſibly connected together; that all good things are equal, and equally to be deſired; that goodneſs admits of no increaſe or diminution.

They own but one God, whom they, however, call by various names, as Fate, Jupiter, &c. by which they did not mean various things, but various powers and relations of the ſame thing. Providence they expreſſed under the name Fate, which Chryſippus defines to be a natural ſeries, or compoſition of things mutually following each other, by an immutable nexus, or tie, fixed from all eternity. They held the immortality of the ſoul.

STOLE, *Stola*, a ſacerdotal ornament worn by the Romiſh pariſh-prieſts over their ſurplice, as a mark of ſuperiority in their reſpective churches; and by other prieſts, over the alb, at celebrating of maſs, in which caſe it goes acroſs the ſtomach; and by deacons, over the left ſhoulder, ſcarf-wiſe; when the prieſt reads the goſpel for any one, he lays the bottom of his ſtole on his head. The ſtole is a broad ſwath, or ſlip of ſtuff hanging from the neck to the feet, with three croſſes thereon. The biſhops anciently pretended, that the pariſh-prieſts were never to appear before them, but in their ſtole. In Flanders and Italy, they always preach in ſtoles; it is ſuppoſed to be a repreſentation of the extremities of the long robe, worn by the high-prieſt of the Jews.

Groom of the STOLE, the eldeſt gentleman of his majeſty's bed-chamber, whoſe office and honour it is to preſent and put on his majeſty's firſt garment, or ſhirt, every morning, and to order the things in the chamber. See BED-CHAMBER.

Order of the STOLE, an order of knights inſtituted by the kings of Arragon.

Another military order, at Venice, is called the order of the golden ſtole; thus called from a golden ſtole, which thoſe knights wore over their ſhoulder, reaching to the knee, both before and behind, a palm and a half broad. None are raiſed to this order but patricians, or noble Venetians. It is uncertain when either of theſe orders was inſtituted.

STOMACH, στομαχος, in anatomy, is a hollow membraneous part, placed moſtly in the left hypocondrium, immediately under the diaphragm, and in an oblique ſituation, between the liver and the ſpleen. Its figure, as may be ſeen in our figure and deſcription of the inteſtines, is like that of the bag of a pair of bag-pipes. Its diviſion is into two parts, viz. into two orifices and a bottom. Its left orifice, called cardia, is placed much higher than its right, and is continuous with the gula, and furniſhed with a great number of nerves. Its right orifice is called the pylorus, and is connected with, or opens into the inteſtines. In this part there is a ſingular valve, the office of which is to cloſe the ſtomach. The pylorus is connected to the upper part of the ſtomach by a ligament. See HYPOCHONDRIA, DIAPHRAGM, &c.

The ſize of the ſtomach in human ſubjects is various; in people addicted to gluttony, it is uſually very large; and in men it is in general larger than in women. In the human body it is always ſingle, but many of the beaſts have ſeveral ſtomachs. Its veſſels are arteries, veins, nerves, and lymphatics. Its arteries, called gaſtricæ, it receives from the cœliac: the gaſtric veins all run to the vena portæ; among theſe are obſervable, the vaſa brevia, which go off to the ſplenic branch, and the vena coronaria, which ſurrounds the ſtomach. Its nerves principally enter at the left orifice; they come from the par vagum, and are very large, and hence it is that the ſtomach is ſo ſenſible: the lymphatics go to the receptaculum chyli.

The ſubſtance of the ſtomach is membranaceous, and is compoſed of four coats. The firſt coat is membranaceous, in the ſtrict ſenſe of the term: the fibres of this run tranſverſely. The ſecond is muſculous;

culous; in this the courſe of the fibres is various, and as it were inextricable. Some of them run circularly, as it were, from the upper part to the lower; and others, only on the upper part of the ſtomach, between the two orifices; others run obliquely from the left ſide to the right, and ſome ſurround the orifice. The third coat of the ſtomach is nervous; this forms a multitude of wrinkles, and is furniſhed with a number of ſanguiferous veſſels, and ſmall glands, which ſecrete the liquor gaſtricus, or liquor of the ſtomach; this is more readily obſerved in hogs, than in the human body. The fourth is a thin, villoſe, and porous coat, and adheres very firmly to the former.

The uſe of the ſtomach is for the digeſtion of our food, that is, to receive, contain, diſſolve, and change what is ſwallowed by the mouth; and after a ſufficient concoction, to expel it through the pylorus into the inteſtines; poſſibly it alſo abſorbs, and retains the moſt ſubtle parts of what it has thus prepared for nutrition. It alſo is the organ in which the ſenſation of hunger reſides.

For the action of the ſtomach in turning the aliments into chyle, ſee CHYLIFICATION.

Heart-Burn, or *Pain in the* STOMACH. See the article CARDIALGIA.

STOMACHIC FEVER. See the article MESENTERIC FEVER.

STOMACHIC, in pharmacy, medicines that ſtrengthen the ſtomach, and promote digeſtion, &c. See the article DIGESTION.

Stomachic corroborants are ſuch as ſtrengthen the tone of the ſtomach and inteſtines, among which are carminatives, as the roots of galangals, red gentian, zedoary, pimpinella, calamus aromaticus, and arum, Of barks and rinds, thoſe of canella alba, ſaſſafras, citron, Seville and China oranges, &c. Of ſpices, pepper, ginger, cloves, cinnamon, cardamums, and mace.

Other things of this nature are, among ſimples, Roman and common chamæmile, wormwood, mint, carduus benedictus, and the four carminative ſeeds. Of preparations, the oil of cedar, oil of oranges by expreſſion, oils of common chamæmile, daucus creticus, aniſum ſtellatum, cumin, carraway, mint, and wormwood, with the ſpirit of ſalt and ſweet nitre.

Among compounds, are the ſal volatile ſylvii, the ſtomachic elixir, the eſſence of orange-peel, with ſweet ſpirit of nitre, tincture of tartar, oils of oranges prepared by expreſſion, the compound eſſence of wormwood, &c.

STOMACHIC, is alſo applied to the arteries, veins, &c. of the ſtomach. See the article STOMACH.

STOMATICA, a term uſed by ſome for all medicines uſed in diſorders of the mouth and fauces.

STONES, in natural hiſtory, are defined to be eſſentially compound foſſils, not inflammable, nor ſoluble in water or oil, nor at all ductile; found in continued ſtrata, or beds, of great extent; formed either of a congeries of ſmall particles, in ſome degree reſembling ſand, and lodged in a ſmoother cementitious matter, and the gritt or ſand-like particles, running together into one ſmooth maſs; or, finally, of granules cohering by contact, without any cementitious matter among them; or compoſed of cryſtal or ſpar, uſually debaſed by earth, and often mixed with talc, and other extraneous particles.

Of this claſs of foſſils there are three orders; and under theſe, eight genera.

The firſt order comprehends all the coarſe, harſh, and rough ſtones, of a lax texture, and compoſed of a viſible grit, reſembling ſand in form, and uſually immerſed in a cementitious matter, and of little natural brightneſs; ſcarce capable of any poliſh, and naturally mouldering away in form of powder from the tools of the workmen. The genera of this order are two, viz. the ammochiſta and pſaduria; the former of which conſtitute our grey and rough ſlates, and the latter comprehends moſt of the ſtones uſed in building, particularly Portland ſtone. See the articles SLATE and PORTLAND-STONE.

The ſecond order conſiſts of ſtones moderately fine, of a more compact and even texture, ſcarce diſtinguiſhable conſtruction, and affording no ſand-like particles to the view; of ſome natural brightneſs, capable of a tolerable poliſh, and flying off from the tools of the workmen in form of ſmall chips. Under this order are comprehended the ſympexia and ſtegania. See the articles SYMPEXIA and STEGANIA.

The third order conſiſts of ſtones of a very fine ſubſtance and elegant ſtructure, naturally of a great brightneſs, and capable of an elegant poliſh; compoſed of granules of various ſhapes and ſizes, but uſually flattiſh, ſometimes more, ſometimes leſs diſtinct; and, in ſome ſpecies, running together into uniform maſſes, but never lodged in any cementitious ſubſtance. Of this order are the marbles, alabaſters, porphyries, and granites.

STONE, *Lithiaſis*, and *Calculus Humanus*, in medicine, a ſtony or terreſtrial concretion in any of the urinary paſſages, which occaſions a difficulty in making water, and a pain in the ſmall of the back, or about the os pubis.

When this collection is ſo large as to form one or more bodies (unable by reaſon of their ſize to paſs through the conduits of urine) they frequently cauſe great pain, ulcers in the parts, and an intire ſuppreſſion of urine; and, from the part where this obſtructing matter happens to lodge, this diſtemper receives its denomination, as from the kidnies, bladder, ureters, or urethra.

This

This diſorder, ſays Dr. Shaw, may ſometimes have an hereditary cauſe; that is, the urinary paſſages may be naturally ſtraighter than they ought to be; or the conſtitution may be naturally diſpoſed to generate a ſtony matter; an obſtructed perſpiration, and a cold or moiſt air, may alſo give riſe to it; for by means hereof the more heavy particles of the animal fluids will be detained in the body.

Another occaſion of this diſtemper may be the uſe of ſuch waters, as by running through various ſtrata of the earth, are impregnated with ſtony particles. There are ſome wines too, and other liquors, which being either foul or not ſufficiently fined down, or abounding in tartar, or other terreſtrial corpuſcles, may lay the foundation for the ſtone. Again, in perſons ſubject to the aſthma or gout, who have a weak digeſtion, viſcid chyle, and ſtony concretions in the joints, there are manifeſt ſeeds of this diſtemper. In ſhort, whatever can bring on an accumulation of earthy particles in the urinary paſſes, whether by obſtructing or leſſening the capacity of the canals, or by immediately or remotely producing the ſubſtance itſelf, will cauſe gravel, and in time the ſtone.

The ſymptoms of the gravel or ſtone are, frequently, a nauſea and vomiting, with a numbneſs down the leg and thigh of the party affected; a pain fixed or moveable, great or leſs, in proportion to the bulk of impacted matter felt generally about the region of the loins, os pubis, and parts adjacent. This pain is very acute, and almoſt continual, when the gravel or ſtone remains at the head of the ureters; but begins to leſſen, as it is protruded forwards. Sometimes when the ſtone is angular, or continues long fixed, the urine is bloody; and, generally in nephritic obſtructions, it is thin, and made in a ſmall quantity, eſpecially at the beginning of the fit. Sometimes there happens a total ſuppreſſion of it, in which caſe both the ureters may be obſtructed.

When the obſtructed matter is forced into the bladder, the urine is turbid, and comes away plentifully; and there appears in it much ſand, and ſometimes ſmall ſtones; which when angular, are ſeldom voided without much pain; and when the paroxyſm is violent, and of long continuance, there ſometimes happens an entire ſuppreſſion of ſtool, ſo far, that cathartics loſe their force; and ſometimes too, though rarely, the terreſtrial matter is depoſited in ſuch parts where the canals are lax and the circulation languid, ſo as at the ſame time to occaſion both an arthritic and nephritic fit. When a ſtone is lodged in the urethra, the pain generally proves exquiſite, but limited to the part, where ſometimes the ſtone will bulge outwards, and may be felt with the fingers.

All paroxyſms, in caſe of a confirmed ſtone, are dangerous. An accumulation of ſand in the kidneys or ureters, is leſs dangerous than a formed ſtone.

A ſtone in the kidneys is of worſe conſequence than in the ureters, and more or leſs ſo in proportion to its bigneſs. The largeſt ſtone, naturally capable of paſſing the urethra in men, is ſuppoſed to be about the ſize of a ſmall hazle-nut; but in women, one conſiderably larger may paſs the meatus urinarius. When both kidneys, or both ureters, are affected, it is ſo much the more dangerous, eſpecially if attended with ſharp pain, exulceration, inflammation, want of ſleep, loſs of ſtrength, a fever, ſuppreſſion of urine, &c. When the ſymptoms continue many days without intermiſſion, the caſe is deſperate; eſpecially if coldneſs has ſeized the extremities, the pulſe ticks, and the patient has cold ſweats, &c. When the caſe is habitual or hereditary, or happens in old age, or gouty conſtitutions, it is difficult.

The ſymptoms of bloody urine, continuing after the fit is gone off, prove hard to remove. When the urine is plentifully diſcharged, has its ordinary ſediment, is turbid, and the ſymptoms decreaſe, it is a ſign the paroxyſm is going off. If a large ſtone be long detained in the urethra, eſpecially if it be rugged, and can neither be propelled backwards nor forwards, and there be a total ſuppreſſion of urine, the caſe uſually proves mortal.

As to the method of cure, it conſiſts in the eaſy excluſion of the ſtone, and the preventing of breeding of others. To this purpoſe, Sydenham recommends bleeding, a poſſet-drink, in which two ounces of marſh-mallow roots have been boiled, and an emollient clyſter; after which he adviſes a pretty large doſe of an opiate; that is, about twenty-five drops of the thebaic tincture, or fifteen grains of the ſaponaceous pills. And Huxham tells us, that nothing is ſo efficaceous to eaſe the pain, and promote the deſcent of the ſtone through the ureters, as a tepid and emollient bath.

Dr. Mead aſſures us, that it is an error in practice, to give ſtrong forcing diuretics, with a view of driving out the gravel with the urine: whereas this intention is anſwered with greater ſafety, in moſt caſes, by relaxing and lubricating medicines; eſpecially if, in caſe of violent pain, bleeding be premiſed, and anodynes interſperſed. He therefore adviſes, to give three or four grains of opium, diſſolved in five or ſix ounces of the common decoction, by way of clyſter. However, he allows, there are conjunctures, after the pain is abated, when powerful diuretics may be adminiſtered; but with this precaution, that as ſoon as they have had their effect, they are no longer to be continued. All this time, the body ſhould be kept open, by giving a turpentine clyſter, and ſometimes purging gently with an infuſion of ſenna and manna, becauſe ſtrong cathartics are to be avoided.

The chief lubricating medicines are oil of ſweet almonds, ſyrup of marſh-mallows, emulſions made with almonds, and the like; to which may be added

the uſe of the warm bath. Soap and lime-water are alſo celebrated lithontriptics.

Such as have a ſtone in the bladder, ſhould, while they are taking the foreſaid medicines, have four ounces or upwards of tepid oyſter-ſhell lime-water injected into the bladder every day; taking care to evacuate their urine before injection, and to retain it as long as they can without pain. And, were it not for the trouble of introducing the catheter, the injection might be made at leaſt twice every day; and if a flexible catheter were always kept in the bladder, it might be done at pleaſure, and the diſſolution of the largeſt ſtone quickly procured. The lime-water will be ſafer, and yet loſe nothing of its virtue, if a dram of ſtarch, or the fourth part of the yolk of an egg, be boiled in ſix or ſeven ounces of it.

Thoſe who, though they have no ſtone in the bladder, are nevertheleſs frequently troubled with fits of the gravel in the kidneys, may probable put a ſtop to the diſorder, by drinking every morning a pint of oyſter-ſhell lime-water, two or three hours before breakfaſt. Its diſagreeable taſte may be mitigated, by adding a very ſmall quantity of new milk to it: alſo a dram and a half, or two drams, of juniper-berries, infuſed in every quart bottle of it, will mend its taſte much.

As to the regimen to be obſerved, Dr. Mead recommends a mild diet, and ſuch as is eaſy of digeſtion; and wine and water, mead, or new ſoft ale, for drink; and gentle exerciſe, eſpecially riding. See the articles DIET and REGIMEN.

For the ſeveral operations in cutting for the ſtone, or the method of cure by extraction, ſee the article LITHOTOMY.

STONE, alſo denotes a certain quantity or weight of ſome commodities. See the article WEIGHT.

A ſtone of beef, at London, is the quantity of eight pounds; in Herefordſhire, twelve pounds; in the north, ſixteen pounds.

A ſtone of wool (according to the ſtatute of 11 Hen. VII.) is to weigh fourteen pounds; yet in ſome places it is more, in others leſs; as in Glouceſterſhire, fifteen pounds; in Herefordſhire, twelve pounds.

A ſtone, among horſe-courſers, is the weight of fourteen pounds.

STONE-CROP, in botany, a ſpecies of ſedum. See the article SEDUM.

STONEHENGE, in antiquity, a famed pile or monument of huge ſtones on Saliſbury plain, ſix miles diſtant from that city.

It conſiſts of the remains of four ranks of rough ſtones, ranged one within another, ſome of them, eſpecially in the outermoſt and third rank, twenty feet high, and ſeven broad; ſuſtaining others laid acroſs their heads and faſtened by mortiſes: ſo that the whole muſt have anciently hung together.

Antiquaries are now pretty well agreed that it was a Britiſh temple; and Dr. Langwith thinks it might eaſily be made probable, at leaſt, that it was dedicated to the ſun and moon. Inigo Jones has given a fine ſcheme of the work, and ſtrives hard to perſuade the world, that it was Roman: but Dr. Langwith, who took his meaſures on the ſpot, aſſures us he could by no means reconcile them with that ſcheme.

STONY LANDS, in agriculture, ſuch as are full of flints, pebbles, or ſmall fragments of free-ſtone.

Theſe lands, in many places, yield good crops; and the general rule is, that, in cold and ſtiff lands, the ſtones ſhould be carefully removed; but, in light and dry lands, it will be advantageous to leave them. However, they always fallow theſe lands every other year, unleſs they ſow peaſe upon them; ſometimes they ſow them with lentils; and when they are quite worn out, they lay them down for clover, or rey-graſs.

STOOL, *Alvus*, in medicine, an evacuation or diſcharge of the fæces, &c. by the anus.

STOOMING *of Wine*, is the putting bags of herbs, or other ingredients, into it. See the article WINE.

STOP, in the manege, is a pauſe, or diſcontinuance of a horſe's motion.

To form a ſtop, you muſt, in the firſt place, bring to the calves of your legs to animate him, bend your body backwards, raiſe the bridle-hand without moving the elbow, then vigorouſly extend your hams, and reſt upon your ſtirrups, and make him form the times or motions of his ſtop, in falcading his haunches three or four times.

STOPS, or points, in grammer. See the articles POINT and PUNCTUATION.

STOPPER, in a ſhip, a piece of cable-laid rope, having a wale-knot at one end, with a laniard faſtened to it; and the other end is ſpliced round a thimble in the ring-bolts upon deck, and at the bits: its uſe is to ſtop the cable, that it may not run out too faſt; in order to which, they make turns with the laniard about the cable, and the wale-knot ſtops it, ſo that it cannot ſlip away faſter than is neceſſary.

STORAX, or STYRAX, in natural hiſtory and pharmacy, a dry and ſolid reſin, of a reddiſh colour, and a peculiarly fragrant ſmell, of which there are two kinds, the ſtyrax calamita, or ſtyrax in tears, and the ſtyrax vulgaris, whereof the former is by far the purer and finer kind, imported in ſmall looſe granules, or elſe in large maſſes compoſed of ſuch granules: it antiently uſed to be packed up in reeds, for the more ſecure carriage; whence the name. The common ſtorax is likewiſe a fine and pure reſin, though leſs ſo than the former; and is brought to us in large lumps, not formed of granules, but of one uniform conſiſtence.

Theſe

These are the two genuine kinds of ſtorax; but neither of them is that met with in our ſhops, which is a kind of ſaw-duſt connected into lumps, by juſt ſo much of the ſtorax-reſin as will make the other matters hang together. This is what our apothecaries uſe, under the name of ſtorax; but it is adviſeable, to ſtrain carefully the pure reſin from the filth, and uſe no part of the latter.

The two genuine kinds of ſtorax, which ought always to be uſed where they can be had, differ only in this; that the granulated ſtorax flows naturally from the ſtyrax-tree, and the common kind is obtained from the ſame tree, by inciſion.

Storax is brought to us from Syria, and the Eaſt-Indies; and ought to be choſen pure, very fragrant, and of an acrid taſte. It is much recommended as a detergent and balſamic, in diſorders of the breaſt: it is alſo eſteemed a cordial, and is recommended in vertigos, and other diſorders of the head and nerves.

Liquid STORAX, in pharmacy, is a drug very different from the reſin above deſcribed; being a reſinous juice, of the conſiſtence of Venice-turpentine, or thicker: it is, when clean, pellucid, of a browniſh colour, with a caſt ſometimes of reddiſh, and ſometimes of greyiſh in it. Its ſmell is ſomewhat like that of common ſtorax, only much ſtronger, and even diſagreeable: its taſte is acrid, aromatic, and ſomewhat bitteriſh; and it is oily, or unctuous. It ſhould be choſen thin, pellucid, of a clean brown colour, and of a very ſtrong ſmell.

There is another coarſer and very impure kind, not at all pellucid, and of a grey or browniſh colour: its ſmell is much more languid, and alſo more diſagreeable than that of the pure kind; whereof it ſeems to be only the dregs, though it is by much the moſt common liquid ſtorax in the ſhops.

Petiver gives the moſt rational account of the origin of liquid ſtorax; which, he ſays, is prepared from the bark of a tree, called by the Turks roſa mallos, which is frequent in the iſland Cobras. The bark of this tree being bruiſed and macerated in ſea-water, is boiled to the conſiſtence of bird-lime; they then collect the reſinous matter that ſwims on the top; which, being foul, is boiled again in ſea-water, and ſtrained: what paſſes the is the finer, and what remains in them the coarſer liquid ſtorax. He adds, that liquid ſtorax is much eſteemed in the eaſt, as a perfume. As to its medicinal virtues, they are nearly related to thoſe of turpentine: it is preſcribed, internally, as a detergent and diuretic; and externally, to prevent mortifications. The French ſpeak much of the virtues of the ointment called unguentum de ſtyrace, which is thus prepared: melt in five ounces of nut-oil, gum elemi and yellow wax, of each three ounces and three drams; add of colophony, ſeven ounces and a half: and when all theſe are perfectly melted together, add three ounces and three drams of pure liquid ſtorax; and let the whole be well mixed, and then cool.

STORK, *ciconia*, in ornithology, a ſpecies of ardea, with the long wing-feathers black: its general colour is white, which with the black wing-feathers makes a very pleaſing variegation: the legs are red, very long, and naked a great way up: when it ſtands erect, it is between three and four feet high; and its body is about the ſize of a gooſe.

But beſides the common ſtork, there are two other ſpecies of ardea known by the ſame name, *viz.* the black ſtork, with the breaſt and belly white, an erect and beautiful bird, ſomewhat larger than the common heron; and the braſilian ſtork, variegated with black and white, much about the ſize of the common heron.

STOVE, in gardening, a kind of conſervatory, artificially warmed for the preſervation of thoſe tender exotic plants that are natives of the torrid zone, which without ſuch aſſiſtance are incapable of enduring the cold of this climate.

Stoves differ from green-houſes by being conſtantly warmed by fire; whereas green-houſes are deſigned for leſs tender plants, and merely to exclude the ſharpneſs of the external air in winter.

Of ſtoves there are two kinds, the dry and bark ſtove; and are of various conſtructions, according as conveniency or fancy directs. Of the dry ſtove we muſt refer to the article green-houſe, it being more immediately connected with it. The ſtove for the ananas or pine-apple, is explained under the article hot-houſe: but the following is a deſcription of a ſtove intended for thoſe very curious exotics which cannot poſſibly exiſt in this country, were it not for theſe artificial contrivances; ſuch as the caſhew, all-ſpice, banane, cabbage-tree, cocoa-nut tree, date-tree, fuſtic-tree, ginger, guaiacum, log-wood, manæ, manchineel, mimoſa, bondue, palm, plantain, ſugar-cane, ſugar apple, tamarind, with numbers of other plants which are natives of the Eaſt and Weſt-Indies, Africa, &c. In Plate LXXXV. fig. 1, 2, 3, is a view of a ſtove of this kind, with the ground plan and ſection, where *d* is the fire-places; *f* the flues; *w* the walk. The length of this ſtove is forty feet; and the breadth, excluſive of the ſhed, is fifteen feet five inches; the back wall one foot two inches; the flue one foot; the walk two feet; the wall of the bark-bed nine inches; the width of the bark-bed eight feet; the walk in front one foot ſix inches, and the front wall nine inches. This ſort of ſtove may be extended to any length at pleaſure, allowing a fire-place for every twenty feet, otherwiſe the houſe cannot be ſufficiently warmed in ſevere weather. The ſhed at the back is abſolutely neceſſary, not only to keep the back of the ſtove warm, but alſo to receive the plants when it ſhould be neceſſary in winter to ſtir up the bark and

refreſh

refreſh it with new; as alſo to ſhelter the fires from the winds. The top and front of the ſtove ſhould be covered in bad weather either with tarpaulins or ſhutters, which will conſiderably add to the warmth, and ſave much fuel. The ſtove plants may be arranged according to their hardineſs; thoſe which are moſt ſuſceptible of cold ſhould be plunged in that part of the bark-bed which is neareſt to the fire-place, there being the greateſt heat; the other ſorts which are leſs tender may occupy the other parts of the bed; but they all ſhould be placed ſo as to form a theatrical ſurface; that is, the talleſt plants in the back, and the ſhorteſt in front, by which diſpoſition they will better receive the rays of the ſun: ſee the ſection in the plate. In the ſtove there ſhould be kept a well graduated thermometer, by which the heat may be regulated: this ſhould be hung up in the cooleſt part of the houſe, with the back of it towards the ſun, whereby the temperature of the air may be more accurately known, and the fires increaſed or diminiſhed accordingly.

STRAIGHT, STREIGHT, or STRAIT, in hydrography. See STRAIT.

STRAIN, in ſurgery, a violent extenſion of the ſinews, or tendons, of ſome muſcle.

STRAIT, or STREIGHT, in hydrography, is a narrow paſſage out of one ſea into another, as thoſe of Gibraltar and Magellan.

STRAKES, in the ſea-language, ſignify the uniform ranges of planks on the bottom, decks, and ſides of ſhips; and the garboard-ſtrake is that next the keel.

STRAMONIUM, in botany, Tournefort's name for the datura of Linnæus. See DATURA.

STRAND, ſignifies any ſhore of the ſea, or bank of a great river: hence an immunity from paying cuſtoms on goods or veſſels, was antiently expreſſed by ſtrand and ſtream.

STRANDED, among ſeamen, is ſaid of a ſhip that is driven aſhore by a tempeſt, or runs on ground through ill ſteerage, and ſo periſhes.

Where any veſſel is ſtranded, the juſtices of the peace are impowered to command the conſtables near the ſea-coaſt to call aſſiſtance, in order to preſerve the ſame, if poſſible.

STRANGURY, in medicine, a difficulty of making water, wherein the urine comes away drop by drop, and is attended with a ſpaſmodic pain about the ſphincter and neck of the bladder; in which ſenſe it is diſtinguiſhed from a dyſury and iſchury. See DYSURY and ISCHURY.

As to the treatment, in order to obtund the acrimony of the blood, and take off the ſpaſtic motions, there is no medicine ſo uſeful as nitre, whether given alone, or mixed with ſome abſterſive ſalt, or with an abſorbent, mixed with a ſmall quantity of an acid to ſaturate it, and with a little cinnabar. A compound powder may be prepared of theſe ingredients, and a ſcruple of it given four times a day, will uſually ſoon take off the complaint. The cooling emulſions, made with barley-water and almonds, and with the cold-ſeeds, are alſo of great ſervice: and when there is farther occaſion for medicines, gum arabic, and pills of boiled turpentine, are found very good ones; and decoctions of liquorice roots in barley-water, with ſyrup of marſhmallows, may be drank in large draughts. Many people are alſo fond of external remedies, and recommend onions, roaſted and buttered, to be applied to the pubes, and goat's ſuet to be rubbed warm about the navel.

A common ſtrangury is often carried off by mere diluters, ſuch as tea, barley-water, or any other watery liquor, drank in large quantities, till a ſweat comes on; and in the gentler caſes, where theſe alone are not quite effectual, there is no better addition to them than a little nitre. Bleeding in time often prevents great miſchiefs from theſe diſorders; and in caſes of a dyſury, brought on by the taking cantharides, there is no remedy ſo powerful as warm milk alone, drank in large quantities. Mr. Boyle has alſo ſaid much in favour of Venice-ſoap on this occaſion.

STRAP, among ſurgeons, a ſtrong piece of leather, or the like, uſed for ſtretching limbs, in the ſetting broken or diſlocated bones.

STRAPS *of a Saddle*, are ſtrong leather thongs, nailed to the bows of a ſaddle, in order to make the girths, &c. faſt.

STRAP, in a ſhip, is a rope ſpliced about any block, or made with an eye, to faſten it any where on occaſion.

STRATA, in natural hiſtory, the ſeveral beds or layers of different matters, whereof the body of the earth is compoſed.

The ſtrata include all the layers of earths, minerals, metals, ſtones, &c. lying under the upper tegument, or ſtratum, the turf or mould.

The time when the ſeveral ſtrata were laid, was doubtleſs at the creation; unleſs, with ſome great naturaliſts, as Steno, Dr. Woodward, &c. we ſuppoſe the globe of the earth to have been diſſolved by the deluge.

The moſt frequent opportunities we have of obſerving theſe in England, is in the coal-mines; where we find them lying in a regular manner, on what appears to us a plane, as we ſee any ſmall part of it: but when we conſider the ſame ſtrata, according to the globular figure of the earth, and ſuppoſe the maſs of the earth to conſiſt of the foregoing, and perhaps in different parts, and at different depths, of ſtrata of ten thouſand other kinds, all originally, while in a ſoft and fluid ſtate, tending toward the center, we ſhall find that it muſt mechanically and almoſt neceſſarily follow, by the continual revolution of the crude maſs from weſt to eaſt, like the winding up of a jack, or the rolling up of the leaves of a paper-book, that every one of theſe

ſtrata, though they each reach the center, muſt, in ſome place or other, appear to the day, or on the ſurface. In which caſe there needs no ſpecific gravitation to cauſe the lighteſt to be uppermoſt; and were it practicable to ſink to the center of the earth, all the ſtrata that are would be found in every part, and, according to the poet, *ponderibus liberata ſuis*. Add to this, that, according to an obſervation of Dr. Stukely, the precipices of all hills are to the weſtward, whereas the aſcent to the eaſt is more gradual.

STRATAGEM, or STRATEGEM, in the art of war, any device for the deceiving an ſurpriſing an enemy.

STRATIFICATION, in chemiſtry, the ranging any thing to be calcined in ſeveral layers or ſtrata one above another; which operation is denoted by the abbreviation *ſ. ſ. ſ.*

STRATOITES, in botany, an aquatic plant growing in ſtanding waters in ſeveral parts of England; the leaves are of a greyiſh colour, about a foot long, ſerrated on their edges, and diſpoſed like thoſe of the aloe: from the center ariſe two or three ſtalks, which are terminated by a diphyllous, compreſſed, obtuſe ſpatha, from which burſts a white flower, conſiſting of three roundiſh heart-ſhaped petals, with many yellow ſtamina, and ſix piſtils divided into two parts, which are ſucceeded by a hexangular capſule with ſix cells, containing a great many oblong incurved ſeeds.

This is the ſame with the aloides of Boerhaave.

STRAWBERRY, *Fragaria*, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh patent petals, diſpoſed in the form of a roſe, and inſerted in the cup; the ſtamina are twenty ſubulated filaments, topped with lunulated antheræ; the germina are ſmall, numerous, and collected into a head, which afterwards becomes a well known large ſoft pulpy fruit, containing a great number of ſmall angular ſeeds.

There are ſeveral kinds of ſtrawberries, as the common or wood-ſtrawberry, the white wood-ſtrawberry, the hautboy-ſtrawberry, the ſcarlet ſtrawberry, the large Chili-ſtrawberry, the green or pine-apple ſtraw-berry; the firſt and ſecond ſorts are found wild in the woods, from whence they are tranſplanted into gardens, by which the fruit is much improved. The beſt ſoil for theſe plants is a freſh loam. They are all propagated from runners, which they produce in great plenty in July, and if the weather is moiſt they quickly take root, which when they have ſufficiently obtained, ſhould be planted out where they are intended to fruit, taking the opportunity of moiſt weather; they ſhould be planted in beds about three feet and a half wide, leaving a path for the conveniency of watering and gathering the fruit. The wood-ſtrawberry may be planted at about ſix inches aſunder, but the other ſorts require a greater diſtance. When the fruit is ripe and gone, the runners ſhould be taken off, and the old plants cleaned of decayed leaves, and the earth ſtirred about them. Theſe will not laſt well above three years; therefore there ſhould be a freſh plantation made every year, in order to have the quantity required. If the weather is dry when they are in flower, it is neceſſary to water them on evenings, but not to wet the bloſſoms. In autumn, the walks between the beds ſhould be dug up, and a little fine earth thrown on the beds, ſo as not to bury the plants, this will greatly ſtrengthen them for fruiting the following year.

Strawberries do very well forced in the ſpring, either on hot-beds or in a ſtove; in the latter they ſhould be planted in pots the preceding autumn and about Chriſtmas, and placed in the front of the place where they can conveniently ſtand: the moſt common ſorts forced are the wood and ſcarlet-ſtrawberries, which, if properly managed, will produce ripe fruit in February; and by putting them in at different periods, may be continued till thoſe in the natural ground are ripe. To have ſtrawberries in autumn, the beſt method is to cut them down when in flower at the natural ſeaſon, afterwards a ſecond crop of bloſſoms ſucceed, and the fruit ripens in September and October.

Strawberry-leaves are frequently uſed in gargariſms for ſore mouths, quinſies, and ulcers of the throat.

The fruit is very grateful both to the palate and ſtomach, abating heat, quinching thirſt, looſening the belly, promoting urine, and expelling ſmall gravel.

STRAY, or ESTRAY, in law. See the article ESTRAY.

STRENGTH, *Vis*, in phyſiology, the ſame with force.

STRENGTHENERS, in pharmacy, medicines that add to the bulk and firmneſs of the ſolids: and ſuch are all abſorbent, agglutinant, and aſtringent medicines

STRIATED, among botaniſts, a term applied to thoſe leaves or fruit which have a number of longitudinal furrows on their ſurfaces.

STRICTOR, in anatomy, the ſame with conſtrictor and ſphincter.

STRIKE, a meaſure of capacity, containing four buſhels.

STRIKE, among ſeamen, is a word variouſly uſed; when a ſhip, in a fight, or on meeting with a ſhip of war, lets down or lowers her top-ſails, at leaſt half-maſt high, they ſay ſhe ſtrikes, meaning ſhe yields, or ſubmits, or pays reſpect to the ſhip of war. Alſo, when a ſhip touches ground, in ſhoal-water, they ſay ſhe ſtrikes. And when a top-maſt is to be taken down, the word of command is, Strike the top-maſt, &c.

STROBILUS, among botaniſts, a kind of pericarpium, formed of an amentum. See the article AMENTUM.

AMENTUM. It consists of a number of vaginæ, with contorted points applied to each other.

STROPHE, in ancient poetry, a certain number of verses, including a perfect sense, and making the first part of an ode. See the article ODE.

STUMÆ, scrophulous tumours arising on the neck and throat, constituting what is commonly called the king's evil. See the article SCROPHULA.

STRUMPFIA, in botany, a genus of plants, whose flower consists of five oblong, obtuse, patent petals, with the same number of ovate antheræ joined in a body; the fruit is a roundish, unilocular berry, crowned with the cup, and contains a roundish seed.

STUC, or STUCCO, in building, a composition of white marble, pulverised and mixed with plaster of lime; and the whole being sifted and wrought up with water, is to be used like common plaster: this is what Pliny means by marmoratum opus, and albarium opus,

STUFF, in commerce, a general name for all kinds of fabrics of gold, silver, silk, wool, hair, cotton, or thread, manufactured in the loom; of which number are velvets, brocades, mohairs, sattins, taffeties, cloths, serges, &c.

STUM, in the wine-trade, denotes the unfermented juice of the grape, after it has been several times racked off, and separated from its sediment. The casks are, for this purpose, well matched, or fumigated with brimstone every time, to prevent the liquor from fermenting, as it would otherwise readily do, and become wine. See the article MATCHING.

It is this fume of the sulphur from the match, that prevents, in this case, all tendency to fermentation, and continues the natural juice of the grape in a sweet state, fit to be readily mixed with wines instead of sugar; for which purpose it is very much used in Holland, and some other countries; as also for giving a new fret, or briskness to decayed wines; so that very large quantities of this stum are annually imported to all parts, along with the foreign wines. And after the same manner a stum is prepared in England, from the juice of apples, which serves the ordinary purposes of the wine-cooper. In the preserving this liquor in this state, we see the vast use of brimstone, for it could never be done otherwise than by the matching of the casks.

Dr. Shaw gives the following method of preparing an artificial stum, nothing inferior to the natural: and as fit for the refermenting, fretting, improving, or making of wines, vinegars, and spirits. Take three pound of fine lump-sugar, or such as has been well refined from its treacle; melt it in three quarts of water, and add, in the boiling, of rhenish tartar, finely powdered, half an ounce; this dissolves with a remarkable ebullition, and gives a grateful acidity to the liquor; take the vessel from the fire, and suffer it to cool, and you have an artificial must, which in all respects resembles the natural taste and sweet juice of a white flavourless grape, when well purified, and racked off from its sediment, in order to make stum. If this artificial must be stummed, that is, well fumigated with burning brimstone, it becomes a perfect stum, and may be made of any flavour, at the discretion of the artist.

STUPOR, a numbness in any part of the body, whether occasioned by ligatures obstructing the blood's motion, by the palsy, or the like.

STURGEON, *Sturio*, in ichthyology, a very large fish, growing to fourteen, sixteen, or eighteen feet in length; though the greater part are caught much smaller.

There are four cirri at the extremity of the under jaw; the eyes are large, and stand at a great distance from the extremity of the rostrum or snout: but what is very singular in the sturgeon, are the spinose tubercles, of which there are several series or rows.

STYE, or STITHE, a disorder of the eye-lids; being a small encysted tumour, about the bigness of a barley-corn.

The stye frequently occasions much pain and uneasiness, and must be treated with great caution, on account of the tenderness of the eye. Some recommend cataplasms, and the like applications; but the eye is often hurt by those, and it is observed besides, that these tubercles seldom give way to topical applications of any kind.

When they are small, Heister thinks it best to let them take their own course; but if so large as to occasion deformity, or danger of hurting the sight, the way to extirpate them, is to make a longitudinal incision on the part, and carefully take them out whole; or, if it cannot be thus got out clean, it must be cut out, as far as may be done, with scissars, and dressed with Egyptian ointment, and a little red precipitate, or touched at times with the common caustic, till eaten thoroughly away, and then the wound dressed and healed in the common manner.

This is the method by which the flat and broad-bottomed tumours of this kind are to be extirpated; and in this, great care must be taken that none of the sharp applications touch the eye, as they might injure the sight.

It is common, however, with these tumours, to hang by a sort of small root, and then they are much more easily managed, there being no more necessary than the cutting them close off with a pair of scissars, or the tying them firmly round with a piece of silk or horse-hair. They are sometimes, if taken in time, dispersed by rubbing them with fasting-spittle, or by applying the pulp of a roasted apple mixed with some saffron and camphor.

STY-

STYGIAN LIQUORS, an appellation given to cauſtic and corroſive waters, and particularly to aqua-regia. See the article AQUA-REGIA.

STYLE, a word of various ſignifications, originally deduced from στυλος, a kind of bodkin, wherewith the ancients wrote on plates of lead, or on wax, &c. and which is ſtill uſed to write on ivory-leaves, and paper prepared for that purpoſe, &c.

STYLE, in botany, is that part of the piſtillum, or female organ of generation, which ſerves to elevate the ſtigma from the germen, on the top of which it is generally placed, and is of various figures. In ſome genera it is very ſhort, as in the ſarracenia; and in others is entirely wanting, as in celandina and poppy. See the articles GERMEN, PISTILLUM, and STIGMA.

STYLE, in dialing, denotes the gnomon or cock of a dial, raiſed on the plane thereof, to project a ſhadow.

STYLE, in matters of language, a particular manner of expreſſing one's thoughts agreeably to the rules of ſyntax; or, as F. Buffier more accurately defines it, the manner wherein the words, conſtructed according to the laws of ſyntax, are arranged among themſelves, ſuitably to the genus of the language.

From this deſcription it appears, that the ſtyle ſuppoſes or includes the ſyntax; and that ſyntax does not extend ſo far as ſtyle, for the ſyntax may be juſt where the ſtyle is wretched.

A fault in ſtyle is not leſs a fault againſt grammar, than is a fault in ſyntax; only the former is leſs preciſe and palpable than the other. A very common error in grammarians, F. Buffier adds, is to confound two kinds of ſtyles in one: grammatical ſtyle, or that directed by the rules of grammar; and the perſonal ſtyle, which depends leſs on the grammar than on the perſon that writes, whether with regard to his particular taſte and genius, or with regard to his matter, or the kind or character of his work. There are a great many differences between the two; the moſt eſſential is, that the one may be diverſified an infinite number of ways, and the other cannot. In effect, the perſonal ſtyle is naturally variable, according to the different genius, humours, and complexions.

It is the imagination that acts, that conceives, that propoſes, and that expreſſes things, according to its character, which is different in all men, and which is to be varied according to the particular kind of the work. Hence ariſe the gay, the grave, the florid, the jejune, the copious, the conciſe, the poetical, the epiſtolary, and the burleſque ſtyles. Theſe perſonal ſtyles are all independent on the grammatical; and we have authors who excel in the one, and are miſerably defective in the other. The perſonal ſtyle is not under the direction of grammar, but of the imagination, or rather of rhetoric, that art having to do directly with our thoughts, as grammar with our words. This, however, may be ſaid, that grammar is far from being able to vary the ſame words of a phraſe, with equal perfection; and that there is but one way of delivering them in the taſte and genius of the language.

In oratory and poetry, ſtyle is reſtrained wholly to what F. Buffier calls the perſonal ſtyle. Language refers principally to the matter of the diſcourſe, viz. the words; elocution to the particular members or parts thereof; and ſtyle, to the whole compoſition.

The maſters of the art reduce the kinds of ſtyle to three; the ſublime, the low, and the intermediate or equable ſtyle. The ſublime ſtyle, is that conſiſting in magnificent words and ſentences; which, by its noble boldneſs, raviſhes the hearers, and extorts admiration, even from the unwilling. See the article SUBLIME.

Low, or ſimple ſtyle, is that ordinarily uſed in ſmaller or humbler works, as epiſtles, dialogues, and common diſcourſe. The chief virtues hereof are perſpicuity, ſmoothneſs, eaſineſs, and cleanlineſs. It muſt be very ſparing in the uſe of tropes and figures, eſpecially the more violent ones, as the proſopopœia, apoſtrophe, &c.

Intermediate, or equable ſtyle, partakes of the magnificence of the ſublime, and the ſimplicity of the low. It neither riſes to the majeſty of the one in words and ſentences, nor yet is ſmartly pointed like the other. Tully calls this the poliſhed and florid ſtyle; it being in this, that all the graces and beauties of language are principally to be uſed.

As to the choice of ſtyle in the general, the nature of the ſubject is to determine it.

Such ſtyle, ſays Cicero, is to be choſen, as expreſſes great things magnificently, middle things moderately, and low things ſubtilly: but more particularly, as there are three branches of the duty of an orator, to teach, to delight, and to move; the ſimple ſtyle is uſed to teach, the middle to delight, and the ſublime to move.

Again, the ſimple or low ſtyle is fit for comedy, the ſublime for tragedy, and the middle for hiſtory. Again, the ſimple ſtyle is fit for bucolics and eclogues, the intermediate for georgics, and the ſublime for epics: which triple difference we may diſcern in Virgil, though he ſometimes mixes them all in the Æneid itſelf, uſing the ſimple ſtyle in the fifth book, where he deſcribes games; and the intermediate in the beginning of the poem.

Care is ſtill to be taken that the ſtyle be not flat and dull, on pretence of being ſimple.

Old-STYLE, the Julian manner of computing times, as the

New-STYLE, is the Gregorian method of computation. See the articles JULIAN, GREGORIAN, BISSEXTILE, &c.

STYLITES, an appellation given to a kind of ſolitaries, who ſpend their lives ſeated on the tops of columns,

columns, to be, as they imagine, the better disposed for meditation, &c.

Of these we find several mentioned in ancient writers, and even as low as the eleventh century. The founder of the order was St. Simon Stylites, a famous anchoret in the fifth century, who took up his abode on a column, six cubits high; then on a second, of twelve cubits; a third, of twenty-two; and, at last, on another of thirty-six. The extremity of these columns were only three feet in diameter, with a kind of rail or ledge about it that reached almost to the girdle, somewhat resembling a pulpit. There was no lying down in it. The faquirs, or devout people of the East, imitate this extraordinary kind of life even to this day.

STYLOGLOSSUS, in anatomy, a muscle arising from the apex of the styloide process; and, descending obliquely to the side and root of the tongue, moves it sideways, backwards, and forwards.

STYLOHYOIDÆUS, in anatomy, a pair of muscles arising in the styloide process, and terminating in the horn and the base: this is often perforated by the digastric muscle of the jaw. These muscles draw laterally upwards.

STYLOIDES, in anatomy, an apophysis of the os petrosum; thus called, from its resembling a style or stylet.

STYLOPHARYNGÆUS, in anatomy, one of the six pair of muscles which serve to dilate the pharynx.

The stylopharyngæus arises from the beginning of the styloide process, and is inserted on both sides into this and into the thyroide process: it serves also to elevate as well as dilate the pharynx.

STYPTIC, *στυπτικον*, in pharmacy, medicines which, by their astringent qualities, stop hæmorrhages. See the article AGARIC.

STYRAX, in botany, the storax-tree. It rises with a woody stalk, twelve or fourteen feet high, covered with a smooth greyish bark, and sends out many slender ligneous branches on every side; these are furnished with oval leaves about two inches long, of a bright green on their upper side, but hoary on their under; they have no indentures, and are placed alternately on short foot-stalks: the flowers come out from the sides of the branches in bunches; they are white, monopetalous, and funnel-shaped, having a short cylindric tube, with a large spreading limb, divided into five obtuse segments: the fruit is a roundish unilocular drupe, containing two roundish acuminated nuts, which are convex on one side and plane on the other.

This tree is a native of several parts of Europe, and of the East. The gum which is obtained by making incisions on its trunk, is used medicine. See the article STORAX.

SUBALTERN, a subordinate officer, or one who discharges his post under the command, and subject to the direction of another; such are lieutenants, sub-lieutenants, cornets, and ensigns, who serve under the captain; but custom has now appropriated the term to those of much lower rank, as serjeants, and the like. We also say subaltern-courts, jurisdictions, &c. such are those of inferior lords, with regard to the lord paramount; hundred courts, with regard to county-courts, &c.

SUBCLAVIAN, *Subclavius*, in anatomy, is applied to any thing under the arm-pit or shoulder, whether artery, nerve, vein, or muscle.

Subclavius more particularly denotes a small oblong muscle lying between the clavicle and first rib. It is fixed by one end in the middle lower portion of the clavicle, at the distance of about an inch from each extremity, and by the other in the cartilage, and a small part of the bone of the first rib.

SUBCOSTAL MUSCLE, *Subcostales*, in anatomy. These muscles are fleshy planes of different breadths, and very thin, situated more or less obliquely on the inside of the ribs, near their bony angles, and running in the same direction with the external intercostals. They are fixed by other extremities in the ribs, the inferior extremity being always at a greater distance from the vertebræ than the superior, and several ribs lying between the two insertions. These muscles are more sensible in the lower ribs than in the upper, and they adhere closely to the ribs that lie between their insertions.

SUBCUTANEOUS, in anatomy, a thin membranous muscle, running under the skin, called also quadratus genæ, and platisma myoides. It arises with a pretty broad origin from the hind part of the neck, and from the pectoral muscle below the clavicle. It adheres firmly to the paniculus cornosus, from which it is not separated without difficulty, and therefore it was not anciently distinguished from it. It is inserted obliquely on each side into the lower jaw bone, near the skin, lips, and sometimes the bottom of the nose, all which parts it draws downwards and awry. A convulsion herein is called the cynic spasm. In some persons it reaches to the ears, which is the reason that some have the faculty of moving their ears which others want.

SUBDUCTION, in arithmetic, the same as subtraction. See SUBTRACTION.

SUBDUPLE RATIO, is when any number or quantity is contained in another twice; thus 3 is said to be subduple of 6, as 6 is duple of 3.

SUBDUPLICATE RATIO, of any two quantities is the ratio of their square roots. See the article RATIO.

SUBER, the cork-tree, in botany. See the article CORK-TREE.

SUBJECT, *Subditus*, a person under the rule and dominion of a sovereign prince or state.

SUBJECT, *Subjectum*, is also used for the matter of an art or science, or that which it considers, or wherein it is employed: thus the human body is the subject of medicine. In this sense the anatomists call

call the body they are diſſecting, and whereon they read lectures, their ſubject. The ſubject of logic is thinking or reaſoning; but more particularly in a ſyllogiſm one of the terms of a propoſition is called the ſubject, and the other the attribute. In poetry, the ſubject is the matter treated of, or the event related or ſet to view. Subject alſo denotes the ſubſtance or matter to which an accident is added, whence the maxim that two contraries can never ſubſiſt in the ſame ſubject.

SUBJUNCTIVE, in grammar, the ſecond mood of verbs, thus called becauſe ſubjoined to another verb, or particle at leaſt, and not ſtanding alone in a ſentence: thus, *Orat ut ad ſe venias. Quid faciam prorſus ignoro. Though this were true*, &c.

SUBLIMATE, a chemical preparation, the baſis whereof is mercury or quickſilver.

There are two kinds of ſublimate, corroſive ſublimate, and ſweet ſublimate, or mercurius dulcis ſublimatus; which ſee under MERCURY.

SUBLIMATION, the condenſing and collecting in a ſolid form, by means of veſſels aptly conſtructed, the fumes of bodies raiſed from them, by the application of a proper heat.

Sublimation is in all reſpects the ſame with diſtillation, except that in the firſt the produce is ſolid, but in the latter fluid. The only variation, therefore, neceſſary in the operation, is the accommodating the recipient part of the apparatus to this difference, which admits, in moſt caſes, that one veſſel may perform the office both of condenſer and receiver, as the matter cannot, like fluids, flow to another part, but muſt remain where it firſt ſettles, except in ſome inſtances, where the matter is extremely volatile, or where a fluid riſing with it renders a depending receiver neceſſary.

The veſſels proper, in reſpect of the different ſubjects of this operation, vary in their ſtructure and the ſubſtance of which they are made, as well on account of the degree of heat requiſite to be employed, as the nature of the matter to be ſublimed, ſince corroſions of them are here, and indeed in all other caſes, to be carefully avoided.

In ſublimations of mercury, whether combined with acids or ſulphur, of ſal ammoniacum and of ſulphur alone, a ſingle veſſel may anſwer all the purpoſes, as their neceſſity of a great heat to keep them in the condition of fumes, renders the upper part of the glaſs capable of detaining them when they are raiſed thereto; but it is proper, in theſe inſtances, that a glaſs in ſand, or earthen ware, ſhould be uſed. A glaſs body, in a ſtrong ſand heat, may very well ſerve for all theſe; but ſublimate of mercury is frequently ſublimed in a bolt-head, or matraſs; and the factitious cinnabar, by thoſe who make large quantities, in an earthen veſſel made in the ſhape of an egg.

In the ſublimation of volatile ſalt of amber, and flowers of Benjamin, a container and condenſer are ſeparately neceſſary, and may in all theſe caſes be extremely well ſupplied by a retort and receiver, though bodies with alembic heads, and receivers of glaſs fitted to them, have been generally recommended in ſeveral of them; but the trouble of luting two junctures, and the difficulty of fitting them to each other, with ſeveral other reaſons, make retorts far more convenient. A retort and receiver are likewiſe proper in the caſe of cinnabar of antimony; for though the cinnabar might be reſtrained in one glaſs, the butter of antimony makes the receiver neceſſary.

In ſublimations of factitious cinnabar, mercury ſublimate, and ſal ammoniacum, it is ſufficient to cover the aperture or neck of the veſſel with a tile; and in the ſublimation of cinnabar of antimony, and flowers of Benjamin, in retorts, it is unneceſſary to lute on the receiver; but in the ſublimation of volatile ſalts, it is requiſite to lute the veſſels as ſecure as poſſible, leaving only a ſmall vent till they attain the greateſt heat they are to ſuffer during the operation.

The requiſite degree of heat in ſublimation varies in almoſt every different ſubject of the operation. The limits are from the greateſt degree that can be given in ſand, to a degree ſomething leſs than that which will make water boil.

Hoffman obſerves, that only thoſe things are ſublimable which contain a dry exhaleable matter in their original conſtruction, and among theſe is found a great variety, which require various methods and means to execute that effect.

Among the minerals, ſulphur, antimony, and orpiment, are named as the principal ſublimable bodies: theſe are of a very lax compage or ſtructure, and eaſily raiſed by fire in ſmall particles, which concrete again on being ſtopped from flying off by the cover of the veſſel; while, on the contrary, iron, ſilver, and the other metals, being of a cloſer ſtructure, remain fixed in the greateſt heat, and never aſcend without being mixed with ſome volatile ſubſtance that is of itſelf capable of riſing and taking up ſome of them with it. Thus copper and iron will be raiſed in ſublimation by means of ſal ammoniac mixed with them; and even gold itſelf is ſaid to be ſubject to the ſame law; Mr. Boyle aſſuring us, that he had a ſecret method of preparing a certain ſaline ſubſtance, by means of a very ſmall admixture of which, gold would be made to riſe in ſublimation, and form fine purple cryſtals.

The admixtures which make bodies ſublimable that are not ſo in themſelves, are to be of various kinds, according to the nature of the body to be ſublimed. Among theſe, ſome act by rendering the body more eaſily fuſible, and diſuniting thoſe particles more readily which the fire is expected to carry up: others act again by preventing the coheſions of the particles of the ſubſtance to be ſublimed, which heat would otherwiſe occaſion: and, finally, others,

by entering the body of the fixed ſubſtance they are mixed with, and giving wings, as it were, to its ſubtle particles, ſo that they may aſcend with its eaſily-ſublimable matter, and join with it in the formation of one mixed ſubſtance in the top of the veſſel, by partaking of the nature of both. Others act potentially in the ſame way, but by different means, themſelves not being capable of ſublimation, but acting on the ſubſtance to be ſublimed, by enervating, weakening, or abſorbing thoſe ſubſtances, or parts, of the mixed body, which would otherwiſe have prevented the aſcent of the reſt: and, finally, ſome act as diſſolvents only, and by that means render things eaſy of ſublimation, which would have been very difficultly ſo, while their parts were in a more ſtrict continuity.

SUBLIME, in diſcourſe, is defined by Boileau, to be ſomething extraordinary and ſurpriſing, which ſtrikes the ſoul, and makes a ſentiment or compoſition raviſh and tranſport.

From this definition it appears, that the ſublime is a very different thing from what the orators call the ſublime ſtyle. The ſublime ſtyle neceſſarily requires big and magnificent words; but the ſublime may be found in a ſingle thought, a ſingle figure, a ſingle turn of words. A thing may be in the ſublime ſtyle, and yet not be ſublime; that is, it may have nothing extraordinary and ſurpriſing.

Longinus makes five ſources of the ſublime: the firſt, a certain elevation of the mind, which makes us think happily: the ſecond is the pathetic, or that natural vehemence and enthuſiaſm which ſtrikes and moves us; theſe two are wholly owing to nature, and muſt be born with us; whereas the reſt depend partly on art: the third is the turning of figures in a certain manner, both thoſe of thoughts and of ſpeech: the fourth, nobleneſs of expreſſion; which conſiſts of two parts, the choice of words, and the elegant figurative diction: the fifth, which includes all the reſt, is the compoſition and arrangement of the words in all their magnificence and dignity.

SUBLINGUAL GLANDS, in anatomy, two glands under the tongue, placed one on each ſide thereof. Theſe, called alſo hypoglottides, filtrate a ſerous humour of the nature of ſaliva, which they diſcharge by little ducts near the gums into the mouth.

SUBMULTIPLE, in geometry, &c. A ſubmultiple number, or quantity, is that which is contained a certain number of times in another, and which, therefore, repeated a certain number of times, becomes exactly equal thereto: thus 3 is a ſubmultiple of 21; in which ſenſe ſubmultiple coincides with an aliquot part.

SUBMULTIPLE RATIO, is that between the quantity contained and the quantity containing: thus the ratio of 3 to 21 is ſubmultiple. In both caſes ſubmultiple is the reverſe of multiple, 21, e. g. being a multiple of 3, and the ratio of 21 to 3 a multiple ratio. See the article RATIO.

SUBNORMAL, in geometry, a line which determines the point in the axis of a curve, where a normal or perpendicular, raiſed from the point of contact of a tangent to the curve, cuts the axis. Or the ſubnormal is a line which determines the point wherein the axis is cut by a line falling perpendicularly on the tangent in the point of the contact.

SUBPŒNA, in law, a writ whereby all common perſons, or thoſe under the degree of peerage, may be called into chancery, in any caſe where the law cannot afford a remedy.

SUBREPTION, *Subreptio*, the act of obtaining a favour from a ſuperior, by ſurpriſe, or a falſe repreſentation. See the next article.

SUBREPTITIOUS, or SURREPTITIOUS, a term applied to a letter, licence, patent, or other act, fraudulently obtained of a ſuperior, by concealing ſome truth, which, had it been known, would have prevented the conceſſion or grant; in which caſe, the benefits of letters, licences, &c. are forfeited.

SUBROGATION, or SURROGATION, in the civil law, the act of ſubſtituting a perſon in the place, and entitling him to the rights, of another: but, in its general ſenſe, ſubrogation implies a ſucceſſion of any kind, whether of a perſon to a perſon, or of a perſon to a thing.

SUBSCAPULARIS, in anatomy, a muſcle ariſing from the baſis and ſide of the ſcapula, and, ſpreading itſelf under the whole convex or underſide of it, is inſerted by a ſemi-circular tendon, into the neck of the os humeri, and draws it down to the ſide of the trunk.

SUBSCRIPTION, in general, ſignifies the ſignature put at the bottom of a letter, writing, or inſtrument.

In commerce, it is uſed for the ſhare or intereſt, which particular perſons take in a public ſtock, or a trading company, by writing their names, and the ſhares they require, in the books or regiſter thereof.

Subſcription, in the commerce of books, ſignifies an engagement to take a certain number of copies of a book intended to be printed, and a reciprocal obligation of the bookſeller, or publiſher, to deliver the ſaid copies, on certain terms.

SUBSEQUENT, ſomething that comes after another, particularly with regard to the order of time.

SUBSIDY, in law, ſignifies an aid or tax granted to the king, by parliament, for the neceſſary occaſions of the kingdom; and is to be levied on every ſubject of ability, according to the rate or value of his lands or goods: but this word, in ſome of our ſtatutes, is confounded with that of cuſtoms.

SUB-

SUBSISTENCE, in the military art, is the money paid to the ſoldiers weekly, not amounting to their full pay; becauſe their cloaths, accoutrements, tents, bread, &c. are to be paid. It is likewiſe the money paid to officers upon account, till their accounts be made up, which is generally once a year, and then they are paid their arrears.

SUBSTANCE, *Subſtantia*, ſomething that we conceive to ſubſiſt of itſelf, independently of any created being, or any particularly mode or accident.

Our ideas of ſubſtances, Mr. Locke obſerves, are only ſuch combinations of ſimple ideas, as are taken to repreſent diſtinct things ſubſiſting by themſelves, in which the confuſed idea of ſubſtance is always the chief. Thus the combination of the ideas of a certain figure, with the powers of motion, thought, and reaſoning joined to the ſubſtance, make the ordinary idea of a man: and thus the mind obſerving ſeveral ſimple ideas to go conſtantly together, which being preſumed to belong to one thing, or to be united in one ſubject, are called by one name, which we are apt afterwards to talk of, and conſider, as one ſimple idea.

We imagine theſe ſimple ideas do not ſubſiſt by themſelves, but ſuppoſe ſome ſubſtratum wherein they ſubſiſt, which we call ſubſtance. The idea of pure ſubſtances is nothing but the ſuppoſed, yet unknown ſupport of theſe qualities, which are capable of producing ſimple ideas in us. The ideas of particular ſubſtances are compoſed out of this obſcure and general idea of ſubſtance, together with ſuch combinations of ſimple ideas, as are obſerved to exiſt together, and ſuppoſed to flow from the internal conſtitution and unknown eſſence of that ſubſtance. Thus we come by the ideas of man, horſe, gold, &c. Thus the ſenſible qualities of iron, or a diamond, make the complex ideas of thoſe ſubſtances, which a ſmith, or a jeweller, commonly knows better than a philoſopher. The ſame happens concerning the operations of the mind, viz. thinking, reaſoning, &c. which we concluding not to ſubſiſt by themſelves, nor comprehending how they can belong to body, or be produced by it, we think them the actions of ſome other ſubſtance, which we call ſpirit, of whoſe ſubſtance or nature we have as clear a notion as of that of body, the one being but the ſuppoſed ſubſtratum of the ſimple ideas we have from without, as the other of thoſe operations which we experience in ourſelves within; ſo that the idea of corporeal ſubſtance in matter, is as remote from our conceptions, as that of ſpiritual ſubſtance.

Hence we may conclude, that he has the moſt perfect idea of any particular ſubſtance, who has collected moſt of thoſe ſimple ideas which do exiſt in it, among which we are to reckon its active powers and paſſive capacities, though not ſtrictly ſimple ideas.

Subſtances are generally diſtinguiſhed by ſecondary qualities, for our ſenſes fail us in the diſcovery of primary ones, as the bulk, figure, texture, &c. of the minute parts of bodies, on which their real conſtitutions and differences depend: and ſecondary qualities are nothing but powers with relation to our ſenſes. The ideas that make our complex ones of corporeal ſubſtances, are of three ſorts: firſt, the ideas of primary qualities of things, which are diſcovered by our ſenſes; ſuch are bulk, figure, motion, &c. Secondly, the ſenſible ſecondary qualities, which are nothing but powers to produce ſeveral ideas in us, by our ſenſes. Thirdly, the aptneſs we conſider in ſubſtance, to cauſe or receive ſuch alterations of primary qualities, as that the ſubſtance ſo altered, ſhould produce in us different ideas from what it did before; and they are called active and paſſive powers: all which, as far as we have any notice or notion of them, terminate in ſimple ideas.

Beſides the complex ideas we have of material ſubſtances, by the ſimple ideas taken from the operations of our own minds, which we experience in ourſelves, as thinking, underſtanding, willing, knowing, &c. co-exiſting in the ſame ſubſtance, we are able to frame the complex idea of a ſpirit; and this idea of an immaterial ſubſtance is as clear as that we have of a material one. By joining theſe with ſubſtance, of which we have no diſtinct idea, we have the idea of ſpirit; and by putting together the ideas of coherent, ſolid parts, and a power of being moved, joined with ſubſtance, of which likewiſe we have no poſitive idea, we have the idea of matter. See MATTER.

Further, there are other ideas of ſubſtances, which may be collective; which are made up of many particular ſubſtances conſidered as united into one idea, as a troop, army, &c. which the mind makes by its power of compoſition. Theſe collective ideas are but the artificial draughts of the mind, bringing things, remote and independent, into one view, the better to contemplate and diſcourſe of them united into one conception, and ſignified by one name; for there are no things ſo remote, which the mind cannot, by this art of compoſition, bring into one idea; as is viſible in that ſignified by the name univerſe.

SUBSTANTIAL, in the ſchools, ſomething belonging to the nature of ſubſtance.

SUBSTANTIVE, in grammar, a noun, or name, conſidered ſimply and in itſelf, without any regard to its qualities, or other accidents, in contradiſtinction to the noun termed adjective, or that which expreſſes a certain quality or accident of the noun ſubſtantive. Or, a noun ſubſtantive is that noun, which, joined to a verb, makes a perfect ſentence, as *a man*, *a horſe*, *a tree*; thus, *a man laughs*, *a horſe gallops*, *a tree buds*, are each of them perfect

perfect ſentences. All nouns, to which one cannot add the word *thing*, are ſubſtantives; and thoſe to which *thing* may be added, are adjectives.

SUBSTITUTE, a perſon appointed to officiate for another, in caſe of abſence, or other legal impediment.

SUBSTITUTE, in medicine, denotes a drug or remedy that may be uſed inſtead of another; or that ſupplies the place of another, of like virtue, which is not perhaps to be had: called alſo ſuccedaneum.

SUBSTITUTION, in grammar, the uſing one word for another. This the grammarians otherwiſe call ſyllepſis.

SUBSTITUTION, in the civil-law, a diſpoſition of a teſtament, whereby the teſtator ſubſtitutes one heir for another, who has only the uſufruit, and not the property of the thing left him.

SUBSTITUTION, in algebra, is the putting, in the room of any quantity in an equation, ſome other quantity, which is equal to it, but expreſſed in another manner.

SUBSTRACTION, or SUBTRACTION, in arithmetic, the ſecond rule, or rather operation, in arithmetic, whereby we deduct a leſs number from a greater, to learn their preciſe difference.

Prob. I. To ſubtract integers of like names, when the minuend, or number to be ſubtracted from, is greater than, or equal to, the ſubducend, or that which is ſubtracted.

Rule 1. Place the ſubducend under the minuend, and draw a line under both. 2. Begin at the right hand; take the leſs from the greater, or equals from equals, and ſet the difference of each row underneath.

Example in integers alone.

Minuend	638
Subducend	213
Remainder	425

Prob. II. To ſubtract integers of the ſame name or denomination, when ſome of the minuend numbers are leſs than their inferior in the ſubducend.

Rule 1. Place your numbers, and begin as before. 2. According to their reſpective value, take one of the next denomination, out of which ſubtract, and to the remainder add, the minuend, ſeting their ſum underneath. 3. Then add what you took, to the next place, on the left hand, and ſo proceed by this, or the former rule.

Example in integers alone.

From	2537
Subtract	1648
Remainder	889

For, by ſaying 8 from 17, I add 10 to the minuend; but I add alſo the ſame to the ſubducend, by ſaying, 1 and 4 = 5, therefore the remainder muſt be the ſame.

For by adding a ten to the units, and taking it away from the tens, the value of the number is not changed.

Examples in integers and parts.

	s.	d.		l.	s.	d.
From	5	3	From	246	3	4
Subt.	2	9	Subt.	68	10	6
Rem.	2	6	Rem.	177	12	10

Theorem. In ſubtraction, the ſubducend, together with the remainder, is equal to the minuend. For all the parts taken together are equal to the whole. And if the ſubducend be taken from the minuend, there reſts the remainder. But if a part be taken from the whole, the remainder will be the other part; therefore, the ſubducend, together with the remainder, are all the parts of the minuend, and conſequently equal to it.

Corollary. Hence addition and ſubtraction ſerve reciprocally to prove each other. See the article ADDITION.

For addition and ſubtraction are oppoſite in all caſes; and what is done by one, is undone by the other.

Thus, if to	6	And if from	10
be added	4	be ſubtracted	4
the ſum is	10	the remainder is	6

That is, if $6+4=10$, then $10-4=6$.

SUBSTRACTION, in algebra, is performed by the following general rule: Change the ſigns of the quantity to be ſubtracted, into their contrary ſigns, and then add it, ſo changed, to the quantity from which it was to be ſubtracted, by the rules of addition; the ſum ariſing by this addition is the remainder.

For to ſubtract any quantity, either poſitive or negative, is the ſame as to add the oppoſite kind. See the article ADDITION.

Examples.

From	$+5a$	$8a-7b$
Subt.	$+3a$	$3a+4b$
Rem.	$5a-3a$, or $2a$	$5a-11b$

From	$2a-3x+5y-6$
Subt.	$6x+4x+5y+4$
Rem.	$-4a-7x \quad 0-10$

It is evident, that to ſubtract, or take away a decrement, is the ſame thing as adding an equal increment. If we take away $-b$ from $a-b$, there remains a; and if we add $+b$ to $a-b$, the ſum is likewiſe a. In general, the ſubtraction of a negative quantity is equivalent to adding its poſitive value.

SUBSTYLAR LINE, in dialing, the line whereon the ſtyle, or gnomon, of a dial is duly erected.

SUB-

SUBTANGENT *of a Curve*, in the higher geometry, is the line which determines the interſection of the tangent with the axis; or, that determines the point wherein the tangent cuts the axis prolonged. See the article CURVE.

SUBTENSE, in geometry, the ſame with the chord of an arch.

Hence, the ſubtenſe of an angle is a right line ſuppoſed to be drawn between the two extremities of the arch that meaſures that angle.

SUBTERRANEOUS, or SUBTERRANEAN, appellations given to whatever is under-ground: thus, naturaliſts ſpeak of ſubterraneous fires, damps, &c.

SUBTILE, in phyſics, an appellation given to whatever is extremely ſmall, fine, and delicate; ſuch as the animal ſpirits, the effluvia of odorous bodies, &c. are ſuppoſed to be.

SUBTRIPLE RATIO, is when one number, or quantity, is contained in another three times: thus, 2 is ſaid to be ſubtriple of 6, as 6 is triple of 2.

SUBULARIA, in botany, a genus of tetradynameous plants, whoſe flower conſiſts of four ovate intire petals, diſpoſed in the form of a croſs; the germen is ovate, with ſcarce any ſtyle; and the ſtigma is obtuſe: the fruit is an oval compreſſed pod, having two cells, which contain a few very ſmall roundiſh ſeeds.

SUBULATED, ſomething in the ſhape of an awl: thus, a ſubulated leaf is one of an oblong and narrow figure, broadeſt at the baſe, and thence gradually decreaſing, till it terminates in a point.

SUCCEDANEUM, in pharmacy, denotes a drug ſubſtituted in the place of another, in medical compoſition.

SUCCESSION, *Succeſſio*, in philoſophy, an idea which we get by reflecting on that train of ideas conſtantly following one another in our minds, when awake. See the article IDEA.

SUCCESSION, in law, implies a right to the whole effects left by a defunct.

SUCCESSOR, in law, one that ſucceeds, or comes in the place of, another.

It is held, that a ſole corporation may take an eſtate in fee to them and their ſucceſſors, but not without the word *ſucceſſors*: whereas an aggregate corporation may take a fee in ſucceſſion, without expreſſing the word *ſucceſſors*; and likewiſe may have goods and chattels in ſucceſſion. See the article CORPORATION.

SUCCINUM, amber, in natural hiſtory. See AMBER.

SUCCISA, in botany and pharmacy, a ſpecies of ſcabioſa, called by ſome morſus diaboli, devil's bit; and ſaid to be alexipharmic, but is little uſed in the preſent practice.

SUCCORY, *Cichorium*, in botany, &c. See CICHORIUM.

SUCCULA, in mechanics, a bare axis, or cylinder, with ſtaves to move it round; but without any tympanum or peritrochium.

SUCCULENT PLANTS, in botany, thoſe whoſe leaves are very thick and full of juice; ſuch are the aloes, &c.

SUCK-FISH, *Remora*, in ichthyology. See the article REMORA.

SUCKERS, in gardening, the ſame with off-ſets. See the article OFF-SETS.

SUCKING-PUMP. See PUMP.

SUCTION, *Suctio*, the act of ſucking or drawing up a fluid, as air, water, milk, or the like, by means of the mouth and lungs.

SUCULA, or SUCCULA. See the article SUCCULA.

SUDAMINA, little heat pimples in the ſkin, like the millet-grains, frequent in youth, eſpecially thoſe of a hot temperament, and that uſe much exerciſe.

SUDATORY, *Sudatorium*, a name given by the ancient Romans to their hot or ſweating-rooms; ſometimes alſo called loconica. See the article BATH.

SUDOR, ſweat, in phyſiology. See the article SWEAT.

SUDOR ANGLICANUS, the ſweating-ſickneſs, a diſeaſe ſo called from its appearing firſt in England, in the year 1483.

It ſeized different patients in different manners; for in ſome it firſt appeared with a pain in the neck, ſcapula, legs, or arms; whilſt others perceived only a kind of warm vapour, or flatulence, running through thoſe parts. And theſe ſymptoms were ſuddenly ſucceeded by a profuſe ſweat, which the patient could not account for. The internal parts became firſt warm, and were ſoon after ſeized with an incredible heat, which thence diffuſed itſelf to the extremities of the body. An intolerable thirſt, reſtleſſneſs, and indiſpoſition of the heart, liver, and ſtomach, were the next ſymptoms, which were ſucceeded by an exceſſive head-ach, a delirium, in which the patient was very trifling and talkative; and after theſe, a kind of extenuation of the body, and an irreſiſtable neceſſity of ſleeping.

For preventing this diſeaſe, temperance is ordered, and the choice of ſalutary aliments and drinks. No crude pot-herbs or ſallads are to be uſed, becauſe they may have received a noxious quality from the air; or, if they are uſed, they are to be previouſly waſhed with warm water.

SUDORIFIC, in pharmacy, an appellation given to any medicine that cauſes or promotes ſweat.

Sudorific, perſpirative, and alexipharmic medicines, ſays Dr. Shaw, make a large part of the common diſpenſatories. A few medicines well choſen, might ſupply the place of all theſe; and of theſe, the principal one would prove to be camphor,

which trial will always ſhew to be greatly ſuperior to bezoar, Gaſcoign's powder, lapis contrayerva, and the like.

The ſame gentleman gives the following eaſy method of preparing a ſafe and effectual ſudorific: take an ounce of refined camphor, beat it in a marble mortar, with two ounces of blanched almonds, till it be reduced to a ſmooth and even paſte. This may be formed into pills, or boluſes, and given, according to the ſtrength of the patient, and other conſiderations, from three grains to forty.

SUET, *Sevum*, or *Sebum*, in anatomy, the ſolid fat found in ſeveral animals, as ſheep, oxen, &c. but not in the human ſpecies.

SUFFOCATION, in medicine, the privation of reſpiration, or breathing; which is ſometimes occaſioned by a congeſtion of blood in the lungs, ſo as to prevent the ingreſs of the air. See the articles ASTHMA, CATARRH, QUINZY, &c.

SUFFOCATION *of the Womb*, or *Matrix*, is a diſeaſe pretty frequent in women, called alſo fits of the mother. See the article HYSTERIC.

SUFFRAGAN, an appellation given to ſimple biſhops, with reſpect to archbiſhops, on whom they depend, and to whom appeals lie from the biſhop's courts.

SUFFRAGE, *Suffragium*, denotes a vote given in an aſſembly, where ſomething is deliberated on, or where a perſon is elected to an office or benefice.

SUFFRUTEX, among botaniſts, denotes an under-ſhrub, or the loweſt kind of woody plants, as lavender, rue, &c.

SUGAR-CANE, *Saccharum*, in botany, a genus of plants, the corolla of which is compoſed of two oblong, acuminated, concave, chaffy valves, containing three capillary filaments topped with oblong antheræ: there is no pericarpium, but each flower contains an oblong, narrow, acute-pointed ſeed.

The root of the ſugar-cane is jointed like thoſe of the reed, from which ariſes ſeveral ſhoots, to the height of eight, nine, or ten feet, according to the goodneſs of the land where they grow; the ſtalks are jointed, and the leaves which are placed at each joint, are long, narrow, of a yellowiſh-green colour, armed with very ſmall ſharp ſerratures, and have each a deep whitiſh furrow, or hollow midrib, which is broad and prominent on the under ſide: the flowers are produced in panicles at the top of the ſtalks; theſe are from two to three feet long, and compoſed of many ſpikes, nine or ten inches long, which are again ſubdivided in ſmaller ones; theſe have long down which incloſes the flowers.

It grows ſpontaneouſly in both the Indies, and is cultivated in great quantities in the Britiſh and French iſlands in the Weſt-Indies. It is propagated there by cuttings or joints of proper lengths; theſe are from fifteen to twenty inches long, in proportion to the nearneſs of their joints or eyes: theſe cuttings are generally taken from the tops of the canes, juſt below the leaves, but if they are choſen from the lower part, where they are leſs ſucculent and better ripened, they would not produce ſo luxuriant canes, but their juice would be leſs crude, and contain a greater quantity of ſalts.

The diſtance which the canes are uſually allowed in planting, is from three to four feet, row from row, and the hills are about two feet aſunder in the rows; in each of theſe hills they plant ſeveral cuttings. The time for planting the canes is always in the rainy ſeaſons. The method practiſed in planting them is to make a trench with a hoe, which is performed by hand; into this a negro drops the number of cuttings intended for planting, at the diſtance the hills are deſigned; theſe are, by other negroes, placed in their proper poſition, and afterwards the earth is drawn up over them. The ground is occaſionally to be kept clear from weeds, and in eight or ten months the canes are fit to cut, to make ſugar from them, which is properly the eſſential ſalt of the cane, as tartar is of the grape. See TARTAR.

The manner in which ſugar is made, is thus: They cut off the reeds at one of the joints near the roots; they are then cleared of the leaves, and tied up in bundles, and ſent to the mills, which are worked either by water or horſes.

The ſugar-mill is compoſed of three rollers of an equal ſize, and all armed with iron plates, where the canes are to paſs between them; only the middle roller is much higher than the reſt, to give the larger ſweep to the two poles to which the horſes are yoked. This great roller in the middle is furniſhed with a cog full of teeth, which catch the notches in the two ſide rollers, and force them about to bruiſe the canes, which paſs quite round the great roller, and come out dry and ſqueezed from all their juice; which runs into a veſſel or back under the mill, and is thence conveyed through a narrow ſpout into the firſt boiler.

After the juice is let out of the firſt veſſel, it is received into another, in which it is boiled more briſkly, and ſcummed from time to time with a large kind of ſpoon, pierced with holes to let the liquor through, while it retains the ſcum and foulneſs ſeparated from it in boiling: towards the end of this boiling, they throw into it a ſtrong lixivium of wood aſhes, with ſome quick-lime among it; this greatly promotes the ſeparation of the foulneſs that yet remains among it; and, after it has boiled ſome time with this addition, they ſtrain it off. The fæces left in the cloths, make a kind of wine, when fermented properly with water. The ſtrained liquor which is now tolerably clean, is let into a third boiler, in which it is boiled down to the conſiſtence of ſugar over a very briſk fire, the people who

who attend it continually ſtirring and ſcumming it.

Great caution is to be uſed that the boiling matter does not riſe over the ſides of the veſſel, which would be of very dangerous conſequence: they prevent this by taking up quantities of the boiling matter with a ladle, lifting it up high, and letting it run in again, and by now and then adding a ſmall piece of butter, or fat of ſome kind, which takes down the bubbling almoſt inſtantaneouſly. They are very careful that no lemon-juice, or any other acid of that kind, comes near the veſſels, a very ſmall admixture of that being ſufficient to keep the matter from granulating.

When the liquor is boiled enough, which is known by its concreting on throwing a ſpoonful of it up into the air, it is then let out into a fourth veſſel, under which there is a very gentle fire, only kept up that it may have leiſure to granulate: when it has begun to granulate, it is let out of this laſt boiler into a kind of conic earthen veſſels, open at both ends; the wideſt aperture is placed upwards, and the ſmaller end downwards, its aperture being ſtopped with a wooden plug.

It is left in theſe veſſels twenty-four hours to concrete; after this, they are removed into ſugar-houſes, and are there arranged in regular order, with a veſſel of earthen-ware under each; the plug is then taken out of the bottom aperture of each, and they are left in this condition for about forty days, that all the thick liquor, or melaſſes, may run from them: after they have ſtood thus long to drain of themſelves, a quantity of clay is diluted, with water, into a thin paſte, and this is poured on the top of every parcel of ſugar in the veſſels, ſo as to cover it two or three inches deep. This water, by degrees, all leaves the clay, and penetrating into the maſs of ſugar, runs through it, and carries off yet more of this foul thick liquid with it, into the veſſels placed underneath to receive it.

When the clay is quite dry, it is taken off, and the firſt preparation of the ſugar is now finiſhed; they ſhake it out of the veſſels, and, cutting it into lumps, which are of a dirty, browniſh, or greyiſh colour, they put it up in hogſheads, and other caſks, under the name of grey or brown ſugar.

The ſugar, in this ſtate, ought to be dry, not unctuous, and to have no taſte of burning. The liquor, which has run from the ſugar in ſtanding, is boiled to a conſiſtence, and ſold under the name of melaſſes, or treacle; this affords, by fermentation, a very clean and good ſpirit. See the article MELASSES.

This coarſe ſugar is afterwards refined to various degrees of purity by new ſolutions, and is ſold at different prices, and under different names, according to the degree of purity it is brought to. Our ſugar refiners firſt diſſolve it in water, then clarify the ſolution by boiling with whites of eggs and deſpumation; and after due evaporation, pour it into moulds; where the fluid part being drained off, and the ſugar concreted, its ſurface is covered with moiſt clay, as before. The ſugar thus once refined, by repetition of the proceſs, becomes the double-refined ſugar of the ſhops.

The candy-ſugar, or that in cryſtals, is prepared by boiling down ſolutions of ſugar to a certain pitch, and then removing them into a hot room, with ſticks placed acroſs the veſſel for the ſugar to ſhoot upon: and theſe cryſtals prove of a white or brown colour, according as the ſugar uſed in the proceſs is pure or impure.

A pound of ſugar purified to the higheſt degree, and diſtilled in a retort, yields firſt about half an ounce of a limpid inſipid phlegm, without ſmell; and after this, comes over a liquor, at firſt limpid and colourleſs, afterwards reddiſh, and, finally, of an empyreumatic ſmell, in quantity not leſs than ſix ounces; this is partly of an acid, partly of an alkaline and urinous taſte: after this, comes over a thick and reddiſh oil, in quantity about three drams; and then more than an ounce of a brown oil of a thicker conſiſtence. The remainder in the retort, calcined and lixiviated, yields a dram of a pure alkaline ſalt.

Sugar is a true ſalt, and when perfectly pure, after ſolution, it concretes into regular cryſtals; theſe are of a priſmatic figure, and conſiſt of eight plain ſurfaces, in two of which the oppoſite baſes are equal and parallel, the reſt are parallelograms. In its natural ſtate, it manifeſts not the leaſt token of any thing, either acid or alkaline. It is inflammable, in a great degree, burning with a very briſk white flame. It diſſolves with the utmoſt readineſs, in all aqueous menſtruums, but very difficultly in ſpirituous or oily liquors: mixed with water, it, after a time, ferments, and acquires a vinous flavour; and at this time, an inflammable ſpirit, like that of wine, may be drawn from it in a conſiderable quantity.

Many other plants and trees might be found which would yield ſugar: thus ſeveral ſpecies of maple afford a juice which boils into good ſugar. But the great quantity of it yielded by the ſugar-cane, and its eaſy culture, renders it unneceſſary to look farther after what it ſo abundantly ſupplies us with.

The uſes of ſugar, as a ſweetner, are ſufficiently known: it promotes the union of diſtilled oils with watery liquors, and prevents the ſeparation of the butyraceous parts from milk; and hence it is ſuppoſed to unite the unctuous part of the food with the animal juices. Sugar is not only innocent, but reconciles to the palate and ſtomach, ſubſtances, of themſelves, diſguſtful to both; and the impure ſorts, in conſequence of their containing an unctuous or oily matter, prove emollient and laxative. The cryſtals are the moſt difficult of ſolution, and conſequently

quently are moſt proper, where this lubricating ſweet is wanted to diſſolve ſlowly in the mouth.

The medicinal preparations of ſugar are, 1. Sugar of roſes, *ſaccharum roſaceum*, thus made: take of red roſe buds, freed from the heels, and haſtily dried, one ounce; and of double refined ſugar, one pound: reduce them ſeparately into powder, then mix and moiſten them with water, that they may be formed into troches, which are to be dried with a gentle heat.

2. Red ſugar of roſes, *ſaccharum roſatum rubrum*, is made thus: take of white ſugar, one pound; juice of red-roſes, four ounces; and red-roſes dried, one ounce: boil the ſugar and juice over a gentle fire, till the juice is almoſt all evaporated; then throw in the dry roſes reduced to a very fine powder. Pour out the matter upon a marble, and form it into lozenges according to art.

Theſe preparations are chiefly valued for their agreeableneſs to the eye and palate: ſome likewiſe eſteem them, medicinally, as light reſtringents; and look upon them, not undeſervedly, as an excellent addition to milk, in phthiſical and hectic caſes. Some have been accuſtomed to add a portion of acid, which improves their colour, but at the ſame time renders them leſs proper to be uſed with milk.

3. Barley-ſugar, *ſaccharum hordeatum ſeu penidiatum*, is made by boiling white ſugar in barley-water, i. e. a decoction of barley, till it acquires ſuch a conſiſtence, as that it may be drawn out, and twiſted into threads or ſtrings: this is rarely prepared by the apothecaries, or conſidered as a medicine.

SUGAR *of Lead, Saccharum Saturni.* See the article SACCHARUM.

Sugar of lead is thus ordured to be made in the London Diſpenſatory: boil ceruſs with diſtilled vinegar, till the vinegar becomes ſufficiently ſweet; then filter the vinegar through paper, and after due evaporation, ſet it to cryſtallize.

SUGILLATION, in medicine, an extravaſation of blood in the coats of the eye, which at firſt appears of a reddiſh colour, and afterwards livid or black. If the diſorder is great, bleeding and purging are proper, as are diſcutients. The following cataplaſm is ſaid to be very good: Take of comfrey-root, ſix ounces; of Solomon's ſeal, two ounces; of elder-flowers, one ounce and a half; of bean-flour, one ounce; let all theſe be boiled in a ſufficient quantity of ſpring-water. The decoction may be uſed as a fotus, and the ingredientt for a cataplaſm.

SUIT, in law, is uſed in different ſenſes, as, 1. For an action, whether perſonal or real. 2. Suit of court, or ſuit-ſervice, which is an attendance the tenant owes to his lord's court. 3. Suit-covenant, where a perſon has covenanted to do ſervice in the court of the lord. 4. Suit-cuſtom, which is where one and his anceſtors have owed ſuit time out of mind. 5. It is uſed for a petition to the king, or any perſon of dignity; where a lord diſtrains his tenant for ſuit, and none is due; in this caſe, the party may have an attachment againſt him to appear in the king's court. 6. Suit of the king's peace, is an action brought againſt a perſon for breach of the king's peace; as in the caſe of treaſons, felonies, or treſpaſſes.

SUIT-SILVER, a ſmall ſum paid in ſome manors, to excuſe the appearance of freeholders at their lord's courts.

SULPHUR, in natural hiſtory, a genus of foſſils, defined to be dry, ſolid, but friable foſſile bodies; melting with a ſmall heat, when fired in the open air; burning almoſt wholly away with a blue flame, and noxious vapour; and indued with an electric power, and not diſſoluble in acids.

Some have uſed the word ſulphur as a name for the whole ſeries of inflammable bodies, but as we have alſo been uſed to diſtinguiſh thoſe of a particular kind by the ſame name, it ſeems much more eligible to reſtrain that name to thoſe bodies, and to give ſome other for the more general claſſes.

The word ſulphur, in this acceptation, becomes the name of a regular genus of foſſils, of which there are four known ſpecies. 1. The yellow native ſulphur, which in its pureſt ſtate is of a pale ſtraw-colour, and as pellucid as the fineſt amber; but is more frequently found coarſer, and more opake. It is found in the gold mines of Peru; in Hungary, and in ſome other places. 2. The green native ſulphur. This is harder than the other, and is uſually found in ſmall maſſes compoſed of ſeveral cruſts. It is found, ſo far as is yet known, only about mount Veſuvius. 3. The grey native ſulphur, which is common in Iceland, and many other places, and is the courſeſt and worſt of all the kinds. And 4. The moſt rare and beautiful of all the kinds, the red native ſulphur. This is of a fine glowing red, like cinnabar, and very bright and tranſparent, and is found, ſo far as is yet known, only in the gold mines of Peru.

But beſides theſe native kinds of ſulphur, there is a factitious ſort, by far the moſt common in the ſhops, ſeparated from extraneous matters by means of fire. It is ſometimes met with in very large maſſes, and called ſulphur in the cake; but what we moſt frequently ſee of it is in oblong cylindric rolls of a yellow colour, ſometimes with, and ſometimes without, an admixture of greeniſh. The yellow contains leſs, the greeniſh more, of the vitriolic ſalt mixed with it; it is friable, and affords a ſort of crackling noiſe, when rubbed between the fingers; it is very eaſily reduced to powder, and melts with a ſmall degree of heat. It may be totally ſublimed, in a cloſe veſſel, without alteration. It takes fire on being brought into contact with a

burning coal, or any ignited matter; and when pure and genuine, for we are liable to great cheats in regard to it, it does not burn away very quickly, but continues a conſiderable time, emitting a deep blue flame. It is to be choſen for internal uſe of the pureſt and brighteſt yellow, light, eaſily broken, and appearing very bright and gloſſy where it breaks. If it be for making oil of ſulphur, the greeniſh rolls are the beſt, as containing moſt acid.

This kind of ſulphur is ſeparated, by means of fire, from various minerals, which are found naturally to contain it.

The greateſt part of what we have, is made from the common vitriolic pyrites, the ſame mineral yielding both ſulphur and vitriol, and often alum. They firſt give it a degree of fire ſufficient to melt the ſulphur it contains, and, when this is all run out into veſſels prepared to receive it, they expoſe the remaining matter to the air, after which they boil it in water, and obtain from the lixivium the common green vitriol or copperas; and after all this is obtained, by adding an alkali to the ſame liquor, they get alum from it. See the articles VITRIOL and ALUM.

Sulphur, under whichever of theſe forms it appears, is ſtill the ſame in all its characters; it diſſolves in oils, and alkaline ſubſtances; it grows red when melted, but turns yellow again when it cools; it affords an acid, the ſame with that of vitriol, if its fumes in burning be catched in a proper manner; but it will not yield this acid by the common way of diſtillation.

Sulphur, melted with gold, provided that metal be pure, makes no ſort of alteration in it; but this is the only metal that eſcapes its effects. Thrown upon ſilver heated red hot, the metal immediately melts, and, if taken from the fire as ſoon as it does ſo, it will be found, when cold, to reſemble lead rather than what it really is. It retains its malleability perfectly, and cuts eaſily with a knife; but it is of a dull bluiſh colour. It is, however, eaſily reduced again to its proper appearance; for there requires no more to this, than the keeping it a few minutes in a ſtrong fire to burn away the ſulphur. If the heat is ſlackened towards the end of this fuſion, the ſilver will not fall into one uniform maſs, but will riſe up in ſmall ſprigs all over the ſurface in a very beautiful manner, reſembling the branches of ſilver, ſometimes ſeen on the ſurface of ores. Tin melted with brimſtone, if the metal be firſt granulated, and the brimſtone added in powder in three times its quantity, deflagrates as if nitre had been mixed with it. The remainder becomes ſolid, while yet in the fire, and, when cold, is a brittle regulus of the colour of lead, and greatly reſembling a ſemi metal in its qualities. Tin may indeed be wholly turned into ſcoria by burning it with additional parcels of ſulphur. Sulphur melted along with lead deſtroys its malleability, as much as it does that of tin. It becomes hard and rigid, and very difficult of fuſion, and loſes the appearance of lead; being, in the regulus thus obtained, compoſed of broad, bright, and glittering particles. Copper melts immediately upon being made red-hot, if brimſtone be added to it; and becomes a black friable ſubſtance. Iron of all other metals melts the moſt freely and readily with the ſulphur, but it does not freely part with it again. A red-hot iron applied to a roll of ſulphur immediately throws off particles diſſolved by the ſulphur into a ſpongy ſcoria. Regulus of antimony melted with ſulphur returns to common crude antimony again. Bizmuth melted with it aſſumes the appearance of antimony, and inſtead of broad flakes is found to be compoſed of needles or ſtriæ running acroſs one another. Zink ſuffers leſs change from it, and mixes indeed leſs eaſily with it; it at length becomes darker-coloured, and more brittle.

Uſes and Preparations of SULPHUR. Beſides the great uſe of ſulphur in medicine, chemiſtry, metallurgy, and the making of gun powder, it is of great ſervice for whitening of ſilks, and woollen ſtuffs; for which purpoſe, its vapour is contrived to be received by them: its vapour alſo whitens red roſes; and even young rooks, taken out of their neſts, and expoſed thereto, become perfectly white: it has alſo the ſame effect upon gold, which may be reſtored to its colour, by boiling it in water with tartar: and, laſtly, its fumes check and prevent fermentation; on which account, it is much uſed by wine-coopers.

As to the medical virtues of ſulphur, it is given, in its crude ſtate, with great ſucceſs in diſeaſes of the lungs. It ſtrengthens and cleanſes them, and promotes expectoration, and has at all times been famous for its virtues againſt cutaneous diſeaſes. It generally proves a little looſening to the bowels, and increaſes the diſcharges by perſpiration; it even communicates its ſmell to the perſpired matter for a conſiderable time after taking it, and will often blacken gold or ſilver that is worn by people who take any conſiderable quantity of it.

The preparations of ſulphur, in moſt frequent uſe in the ſhops, are, 1. Flowers of ſulphur, *flores ſulphuris*, a good pectoral medicine. See the article FLOS. 2. Precipitated ſulphur, commonly called milk of ſulphur, made by boiling flowers of ſulphur, with thrice their weight of quick-lime, till the ſulphur is diſſolved; and then filtering the ſolution through paper, let a precipitation be made with weak ſpirit of vitriol; and laſtly, by waſhing the precipitated powder found at the bottom of the veſſel, till it becomes quite inſipid. This is good in all uſes, wherein ſulphur in ſubſtance, or its flowers, are uſed; its doſe being from ten grains to two ſcruples. 3. Balſam of ſulphur is made by boiling flowers of ſulphur in four times their weight of oil of olive, in a pot lightly covered, till the oil and

ſulphur are united into the conſiſtence of a balſam: and in the ſame manner may a balſam of ſulphur be prepared with Barbadoes-tar. This, though highly extolled as a pectoral by ſome authors, ought to be given with great caution, ſince its acrimony muſt render it injurious to weak lungs. 4. Spirit or oil of ſulphur is an acid, obtained by retaining in any manner the vapours of burning ſulphur; it is wholly the ſame with that of vitriol; being an agreeable acid, and good in every caſe in which the ſpirit of vitriol is ſo. 5. Sulphurated water, *aqua ſulphurata*, is made thus: take common water one quart, of pure ſulphur half a pound, ſet a part of the ſulphur on fire in an iron ladle, and ſuſpend it in that ſtate over the water in a cloſe veſſel; let the remainder of the ſulphur be afterwards fired and ſuſpended in the ſame manner, and when the operation is over, the water will have acquired a ſharp acid taſte, and is to be reſerved for uſe. The moſt commodious veſſel for making this is a large glaſs receiver fitted with a wooden plug, into which the handle of the ladle may be fixed; as ſoon as the ſulphur is fired, the ladle is to be thruſt ſo far into the receiver, that the plug may come to ſtop the aperture, and the covering the mouth over this with a wet cloth will be ſufficient to keep in the fumes.

This is the liquor called by ſome authors *gas ſulphuris*; it is an agreeable acid, and is good in malignant and petechial fevers, given in the common drink. It quenches thirſt, and cools the mouth and tongue.

SULPHUR-WORT, in botany, a name by which ſome call the hog's-fennel. See the article PEUCEDANUM.

SULTAN, or SOLDAN, a title of honour, given to the emperor of the Turks. The wife of a ſultan is called ſultana, and the favourite one hhaſeki-ſultana, i. e. the private ſultana.

SUM, *Summa*, in mathematics, ſignifies the quantity that ariſes from the addition of two or more magnitudes, numbers, or quantities together. See ADDITION.

The ſum of an equation is, when the abſolute number being brought over to the other ſide of the equation, with a contrary ſign, the whole becomes equal to 0: thus, the ſum of the equation $x^3 - 12x^2 + 41x = 42$, is $x^3 - 12x^2 + 41x - 42 = 0$.

SUMACH, *Rhus*, in botany. See the article RHUS.

Myrtle SUMACH, *Coriaria*, in botany. See the article CORIARIA.

SUMMARY, in matters of literature, the ſame with abridgment.

Summary, however, is often uſed for a table of contents, placed at the beginning of books, to ſhew the principal heads treated of therein.

SUMMATORIUS CALCULUS, in mathematics. See the article CALCULUS.

SUMMER, one of the ſeaſons of the year, commencing in theſe northern regions on the day the ſun enters Cancer, and ending when he quits Virgo. Or, more ſtrictly and univerſally, the ſummer begins on the day when the ſun's meridian diſtance from the zenith is the leaſt; and ends on the day, when his diſtance is a mean betwixt the greateſt and ſmalleſt. The end of ſummer coincides with the beginning of winter.

SUMMER, in architecture, is a large ſtone, the firſt that is laid over columns and pilaſters, in beginning to make a croſs vault; or it is the ſtone which, being laid over a piedroit or column, is hollowed to receive the firſt haunce of a platband.

SUMMER, in carpentry, is a large piece of timber which being ſupported on two ſtone piers or poſts, ſerves as a lintel to a door, window, &c.

SUMMIT, the top or vertex of any body, or figure; as of a triangle, cone, pyramid, &c.

SUMMITS *of Flowers*, the ſame with the antheræ, or apices.

SUMMONS, in law, a citing or calling a perſon to any court, to anſwer a complaint, or even to give in his evidence.

There muſt alſo be a ſummons in real actions, whereby the ſheriff warns the party to appear at a day on the tenant's land; alſo fourteen days before the return, proclamation is to be made thereof, in order that the grand cape may iſſue.

SUMMONS and SEVERANCE. See the article SEVERANCE.

SUMMUM BONUM, in ethics. See the articles GOOD and HAPPINESS.

SUN, *Sol*, ☉, in aſtronomy, the great luminary which enlightens the world, and by its preſence, conſtitutes day.

The ſun is the principal ſource of heat upon the earth's ſurface, and the confines of the earth and atmoſphere: without this, ſays Dr. Shaw, all the bodies upon our globe would doubtleſs grow fixed, rigid and lifeleſs; it being the ſolar heat that ſtirs within them, as the main ſpring of their actions; cauſing all the operations in the animal, vegetable, and mineral kingdoms; and hence alſo, the ocean and atmoſphere continue in a fluid ſtate.

Sir Iſaac Newton, in his Optics, gives good reaſons to ſuppoſe the ſun and fixed ſtars to be great earths vehemently hot; whoſe heat is conſerved by the greatneſs of their bodies, and the mutual action and re action between them and the light which they emit; and whoſe parts are kept from fuming away, not only by their fixity, but alſo by the vaſt weight and denſity of the atmoſpheres incumbent on them, and every way ſtrongly compreſſing them, and condenſing the vapours and exhalations which ariſe from them. The light ſeems to be emitted from the ſun and fixed ſtars (which probably are ſuns to other ſyſtems) much after the manner as iron,

iron, when heated to such a degree as to be just going into fusion, by the vibrating motion of its parts, emits, with force and violence, copious streams of liquid fire all around. Great bodies must preserve their heat longest, and that, perhaps, in the proportion of their diameters. See the article STAR.

The sun, then, may be conceived to be a huge body of fire, whence all the planets receive their light; and by the emanation of whose rays and beams of light, the whole system of beings about us is illuminated and rendered visible.

By means of the solar spots it hath been discovered, that the sun revolves round his own axis, without moving (considerably) out of his place, in about twenty five days. And that the axis of this motion is inclined to the ecliptic, in an angle of 87 degrees, 30 minutes, nearly. See the articles MACULÆ and FACULÆ.

The sun's apparent diameter being sensibly shorter in December than in June, as is plain and agreed from observation, the sun must be proportionably nearer to the earth in winter than in summer; in the former of which seasons will be the perihelion, in the latter the aphelion: and this is also confirmed by the earth's moving swifter in December than it does in June. For since, as Sir Isaac Newton has demonstrated, the earth always describes equal areas in equal times, whenever it moves swifter, it must needs be nearer to the sun. And, for this reason, there are about eight days more from the sun's vernal equinox to the autumnal, than from the autumnal to the vernal.

For the apparent annual motion round the earth, see the article EARTH.

If you divide 360 degrees (i. e. the whole ecliptic) by the quantity of the solar year, it will quote 59 minutes 8 seconds, &c. which therefore is the quantity of the sun's diurnal motion. And, if this 59 minutes 8 seconds be divided by 24, you have the sun's horary motion, which is 2 minutes 28 seconds; and, if you will divide this last by 60, you will have this motion in a minute, &c. And this way are the tables of the sun's mean motion, which you have in the books of astronomical calculations, constructed.

For eclipses of the sun, cycle of the sun, maculæ and faculæ of the sun, &c. see ECLIPSE, CYCLE, &c.

SUN-DEW, *Drosera*, in botany. See DROSERA.

SUN-FLOWER, in botany, the English name for the helianthus. See the article HELIANTHUS.

Dwarf SUN-FLOWER, *Rudbeckia*, in botany. See the article RUDBECKIA.

SUNDAY, or the LORD'S-DAY, a solemn festival observed by Christians on the first day of every week, in memory of our Saviour's resurrection.

This is the principal and most noted of the Christian festivals, and was observed with great veneration in the ancient church, from the time of the apostles, who themselves are often said to have met on that day for divine service.

It is likewise called the sabbath-day, as being substituted in the room of the Jewish sabbath. See the article SABBATH.

The ancients retained the name Sunday, or *dies solis*, in compliance with the ordinary forms of speech, the first day of the week being so called by the Romans, because it was dedicated to the worship of the sun.

Besides that the most solemn parts of the Christian worship were always performed on Sundays, this day was distinguished by a peculiar reverence and respect expressed towards it in the observation of some special laws and customs. Among these, we may reckon, in the first place, those imperial laws which suspended all proceedings at law upon this day, excepting only such as were of absolute necessity, or eminent charity; such as the manumission of slaves, and the like. Neither was it only the business of the law, but all secular and servile employments were superseded upon this day, still excepting acts of necessity and mercy.

Another thing which the Christian laws took care of, to secure the honour and dignity of the Lord's-day, was, that no ludricrous sports or games should be followed on this day; but all such recreations and refreshments, as tended to the preservation or conveniency of life, were allowed of; and therefore, Sunday was always a day of feasting, and it was not allowable to fast thereon, not even in Lent.

The great care and concern of the primitive Christians in the religious observation of the Lord's day, appears, First, from their constant attendance upon all the solemnities of public worship, from which nothing but sickness, imprisonment, banishment, or some great necessity could detain them.

Secondly, from their zeal in frequenting religious assemblies on this day, even in times of the hotest persecution, when they were often beset and seized in their meetings and congregations.

Thirdly, from their studious observations of their vigils, or nocturnal assemblies, that preceded the Lord's day.

Fourthly, from their eager attendance on sermons, in many places, twice upon this day, and their constant resorting to evening prayers, where there was no sermon.

Lastly, from the severe censures inflicted on those who violated the laws concerning the religious observation of this day, such persons being usually punished with excommunication; as appears from the apostolical constitutions, and the canons of several councils.

In the Romish breviary, and other offices, we meet with a distinction of Sundays, into those of the first

first and second class: Sundays of the first class, are, Palm-Sunday, Easter-Sunday, Advent-Sunday, Whit-Sunday, &c. those of the second class are the common Sundays of the year.

By our laws, no person is to do any worldly labour on this day, which is set apart for the service of God, except works of necessity and charity, under the penalty of five shillings. And if any person cry, or expose to sale, any wares or goods on a Sunday, the same will be forfeited to the poor, &c. the offender being convicted thereof before a justice of the peace, who is authorised to cause the penalties and forfeitures to be levied by distress. Yet this extends not to dressing of meat, nor to the crying or selling of milk in the morning or evening, or the selling of mackrel on that day.

The Sunday is not a day in law, so that no process lies, or may be served thereon, except for treason, or felony, or an escape. A sale of goods, or contract made on a Sunday, is deemed void.

SUNDAY-LETTER. See the article DOMINICAL-LETTER.

SUPERCARGO, a person employed by merchants to go a voyage, and oversee their cargo, or lading, and dispose of it to the best advantage. See the articles CARGO, FACTOR, &c.

SUPERCILIUM, in anatomy, the eye-brow. See the article EYE-BROW.

SUPERCILIUM, in the ancient architecture, the uppermost member of the corniche, called by the moderns corona, crown, or larmier.

SUPEREROGATION, in theology, what a man does beyond his duty, or more than he was commanded to do. The Romanists stand up strenuously for works of supererogation, and maintain, that the observance of evangelical councils is such. By means hereof, a stock of merit is laid up, which the church has the disposal of, and which she distributes in indulgences to such as need. The reformed church do not allow of any work of supererogation.

SUPERFETATION, *Superfœatio*, in medicine, a second, or after conception, happening, when the mother, already pregnant, conceives of a later coition; so that she bears at once two fœtuses of unequal age and bulk, and is delivered of them at different times.

SUPERFICIES, or SURFACE, in geometry, a magnitude considered as having two dimensions; or extended in length and breadth, but without thickness or depth. In bodies, the superficies is all that presents itself to the eye. A superficies is chiefly considered as the external part of a solid. When we speak of a surface simply, and without any regard to body, we usually call it figure. The several kinds of superficies are as follow. Rectilinear superficies, that comprehended between right lines; curvilinear superficies, that comprehended between curve lines; plane superficies, is that which has no inequality, but lies evenly between its boundary lines; convex superficies, is the exterior part of a spherical, or spheroidical body; and a concave superficies, is the internal part of an orbicular or spheroidical body.

The measure or quantity of a superficies, or surface, is called the area thereof.

The finding of this measure, or area, is called the quadrature thereof.

To measure the surfaces of the several kinds of bodies, as spheres, cubes, parallelepipeds, pyramids, prisms, cones, &c. see the article SPHERE, &c.

Line of SUPERFICIES, a line usually found on the sector, and Gunter's scale, the description and use whereof, see under SECTOR and GUNTER'S SCALE.

SUPERFINE, in the manufactories, a term used to express the superlative fineness of a stuff; thus a cloth, a camblet, &c. are said to be superfine, when made of the finest wool, &c. or when they are the finest that can be made. The term is particularly used among gold or silver wire-drawers, for the gold or silver wire, which after being drawn through an infinite number of holes, each less and less, is at length brought to be no bigger than an hair.

SUPERINSTITUTION, *Superinstitutio*, denotes an institution upon another, as where A B is admitted and instituted to a benefice upon one title, and C D is admitted and instituted on that of another.

SUPERINTENDANT, in the French customs, an officer who has the prime management and direction of the finances or revenues of the king. The term is also used for the first officer of the queen's household, who has the chief administration thereof. They have also a superintendant of the buildings, answering to the surveyor of the works among us.

SUPERINTENDANT also denotes an ecclesiastical superior in several reformed churches, where episcopacy is not admitted, particularly among the Lutherans in Germany, and the Calvinists in some other places. The superintendant is in effect little other than a bishop, only his power is somewhat more restrained than that of the diocesan bishops. He is the chief pastor, and has the direction of all the inferior pastors within his district or diocese.

SUPERIOR, or SUPERIOUR, something raised above another, or that has a right to command another.

SUPERJURARE, was anciently a term used in our law where a criminal endeavoured to excuse himself by his own oath, or by the oath of one or two witnesses; and the crime charged against him so notorious, that he was convicted upon the oaths of many more witnesses; this was termed superjurare.

SUPERLATIVE, in grammar, one of the three degrees of comparison, being that inflection of noun-adjective that serves to augment and heighten their signification, and shews the quality of the thing denoted to be in the highest degree.

In English, the superlative is usually formed by the addition of *est* to the positive, as *richest*, *greatest*, &c. and frequently by prefixing of *most*, as *most rich*, *most great*, &c.

SUPERNUMERARY, something over and above a fixed number. In several of the offices are supernumerary clerks, to be ready on extraordinary occasions. There are also supernumerary surveyors of the excise, to be ready to supply vacancies when they fall; these have but half pay. In music, the supernumerary, called by the Greeks proslambanomenos, is the lowest of the chords of their system, answering to *a*, *mi*, *la*, of the lowest octave of the moderns.

SUPERONERATIONE PASTURÆ, in law, a judicial writ which lies against a person that is impleaded in the county-court, for surcharging of a common with his cattle, in a case where he was formerly impleaded for it in the same court, and the cause is removed to one of the courts of Westminster.

SUPER-PURGATION, *Hypercathrasis*, in medicine, an excessive over-violent purging, the usual effects of colliquating, corrosive and stimulating medicines. In the beginning of this disorder, a very thin matter is evacuated: but afterwards, when the relaxation and aperture of the vessels are increased, the necessary humours are discharged; there is first an excretion of yellow bile, then of phlegm, then of black bile, and last of all blood. See the article FLUX.

Those who labour under a superpurgation, must be treated with frictions of the skin, and a warm bath; drinking, before they bathe, thin, red, or yellow wine, for such is easiest of distribution, with sops of bread, and pomegranates.

If the evacuation continues, let the limbs be bound in such a manner, that the bandage may be carried from the upper to the lower parts. Exhibit also a small quantity of theriaca, to be taken with the flesh of vipers, or, for want of that, troches of theriaca, or troches of seeds, and of the antidote called philonium. Cupping-glasses may also be applied to the stomach, and cataplasms of polenta and mulsum; after which, you may use astringent epithems, but the greatest relief is had from frictions of the whole body, and potable remedies. The patient should keep himself from cold air, or what is very warm. If the evacuation still continues, the aforesaid cataplasms should be applied, and obtundents injected in clysters, such as the fat of geese, sweet wine, oil of spike, and the like.

SUPERQUADRIPARTIENS. See the article RATIO.

SUPERSCAPULARIS INFERIOR, in anatomy, the same with infraspinatus. See the article INFRASPINATUS.

SUPERSCAPULARIS SUPERIOR, is the same with supraspinatus. See the article SUPRASPINATUS.

SUPERSEDEAS, in law, according to Fitzherbert, is a writ which lies in divers cases, and in general signifies a command to stay some of the ordinary proceedings in law, which, on good cause shewn, ought not to proceed. It is likewise used for staying of an execution after a writ of error is allowed, and bail put in, but not before bail is given, in case there be a judgment upon verdict, or by default in debt, &c.

A supersedeas is also granted by the court for setting aside an erroneous judicial process, &c. And a prisoner may be thereby discharged upon entering his appearance, and on the plantiff's not filing a declaration against him. For this writ is as good a cause to discharge the person, as the first process is to arrest him. There is a further writ of supersedeas, where an audita querela is sued, and in cases of surety of the peace, when one is already bound to the peace in chancery, or elsewhere.

SUPER-STATUTO DE ARTICULIS CLERI, in law, a writ that lies against the sheriff, or other officer, that distrains in the king's highway, or in the lands anciently given to the church.

SUPER-STATUTO FACTO POUR SENESCHAL ET MARSHAL DE ROY, &c. a writ which lies against the steward or marshal, for holding plea of freehold in his court, or for trespass, or contracts not made within the king's household.

SUPER-STATUTO VERSUS SERVANTES ET LABORATORES, a writ lying against a person who keeps another person's servant departed from his service, contrary to law.

SUPERSTITION, extravagant devotion, or religion, wrong directed, or conducted.

SUPERVISOR, a surveyor or overseer.

It was formerly, and still remains a custom among some persons, to appoint a supervisor of a will, to see that the executors thereof do punctually observe and perform the same.

Supervisor formerly was used for surveyor of the highways. There are likewise certain officers of the excise, who are called supervisors, on account of their having the supervising and inspecting of the books, &c. of the inferior officers belonging to that branch of the revenue, to prevent their neglect of duty.

SUPINATION, in anatomy, the action of a supinator-muscle, or the motion whereby it turns the hand so as that the palm is lifted up towards heaven.

SUPINATOR, in anatomy, a denomination given to two muscles of the arm, the one called

the ſupinator longus, the other the ſupinator brevis, both ſerving to turn the palm of the hand upwards. The firſt has its origin from the exterior ſpine of the humerus, and its termination at the lower end of the radius; the ſecond riſes from the upper part of the ulna, and is inſerted into the upper part of the radius, which it totally ſurrounds and incloſes. This laſt muſcle may alſo be of uſe in the bending of the cubit.

SUPINE, in Latin grammar, part of the conjugation of a verb, being a verbal ſubſtantive of the ſingular number, and the fourth declenſion.

There are two kinds of ſupines; one, called the firſt ſupine, ending in *um*, of the accuſative caſe, is always of an active ſignification, and marks a motion, as *abiit deambulatum*; the other, called the laſt ſupine, and ending in *u*, of the ablative caſe, is of a paſſive ſignification, and is governed by ſubſtantives or adjectives, as *facile dictu*, &c.

SUPPLE, to ſupple a horſe in the manege, is to make him bend his neck, ſhoulders, and ſides, and to render all the parts of his body more pliable.

SUPPLEMENT *of an Arch*, in geometry, or trigonometry, is the number of degrees that it wants of being an intire ſemicircle; as a complement, ſignifies what an arch wants of being a quadrant.

SUPPLEMENT, in matters of literature, an appendage to a book, to ſupply what is wanting therein.

SUPPLICAVIT, in law, a writ that iſſues out of the court of Chancery for taking ſurety of the peace, where a perſon is in danger of receiving ſome bodily hurt from another. It is directed to the juſtices of the peace and ſheriff of the county, and is grounded on the ſtatute 1 Edw. III. which appoints, that certain perſons ſhall be appointed by the lord-chancellor to take care of the peace. In order to ſue out this writ, the party requiring it firſt goes before one of the maſters in Chancery and makes oath, that he does not deſire the ſame out of any malice, but purely for his own ſafety, and the ſecurity of his perſon; upon which the maſter will make out a warrant, ordering the writ to be made out by one of the clerks of the ſix clerk's office, after which the writ muſt be delivered to the ſheriff to have his warrant thereon for arreſting the party, &c.

SUPPORTED, in heraldry, a term applied to the uppermoſt quarters of a ſhield when divided into ſeveral quarters, theſe ſeeming as it were ſupported or ſuſtained by thoſe below. The chief is ſaid to be ſupported when it is of two colours, and the upper colour takes up two thirds of it. In this caſe it is ſupported by the colour underneath.

SUPPORTERS, in heraldry, figures in an atchievement placed by the ſide of the ſhield, and ſeeming to ſupport or hold up the ſame. Supporters are chiefly figures of beaſts: figures of human creatures, for the like purpoſe, are properly called tenants. Some make another difference between tenant and ſupporter: when the ſhield is borne by a ſingle animal, it is called tenant; when by two, they are called ſupporters. The figures of things inanimate ſometimes placed aſide of eſcutcheons, but not touching or ſeeming to bear them, though ſometimes called ſupporters, are more properly cotiſes.

The ſupporters of the Britiſh arms are a lion and an unicorn: thoſe of the French arms are angels &c. See ARMS.

In England, none under the degree of a banneret are allowed ſupporters, which are reſtrained to thoſe called the high nobility. The Germans permit none but princes and noblemen of rank to bear them: but among the French the uſe of them is more promiſcuous.

SUPPOSITION, in muſic, the uſing two ſucceſſive notes of equal value as to time, one of which, being a diſcord, ſuppoſes the other a concord.

The harmony, Mr. Malcolm obſerves, is to be always full on the accented part of the meaſure or bar, and void of diſcords; yet here diſcords, by proper reſolution and preparation, are even neceſſary on the accented part of the meaſure. Diſcords, by conjoint degrees, may paſs without much offence, and it is not there required that the harmony be ſo complete as on the accented part. This tranſient uſe of diſcords, followed by concords, makes what the French call ſuppoſition. There are ſeveral kinds of ſuppoſition. The firſt is when the principal parts proceed gradually from concord to diſcord, and from diſcord to concord; the intervening diſcord ſerving only as a tranſition to the following concord. Another kind is when the parts do not proceed gradually from diſcord to concord, but deſcend to it by the interval of a third. A third kind, like the ſecond, is when the riſing to the diſcord is gradual, but the deſcending from it to the following concord, is by the diſtance of a fourth. A fourth kind, very different from all the reſt, is when the diſcord falls on the accented part of the meaſure, and the riſing to it is by the interval of a fourth; in which caſe it is abſolutely neceſſary to follow it immediately by a gradual deſcent into a concord that has juſt been heard before the harmony to make the preceding diſcord paſs without offence, and only ſeem a tranſition to the concord.

SUPPOSITORY, *Suppoſitorium*, in pharmacy, a kind of medicated cone, or ball, which is introduced to the anus, for opening the belly.

Suppoſitories are uſually made of ſoap, ſugar, alum, or a piece of tallow-candle, about the length of a man's thumb and the breadth of a finger, tho' they may be made ſmaller for children, and ſometimes a little thicker for adults.

Suppoſitories are ſometimes compounded of ingredients

gredients adapted to the diſeaſe and circumſtances of the patient, as of honey, ſalt, powder of aloes, colocynthia, and the like. If one ſuppoſitory does not occaſion a ſtool, it muſt be followed by another ſtronger one; and if that does not ſucceed, the repetition muſt be continued till the effect required is produced. They are ſometimes lubricated with oil or butter, that they may be introduced with greater eaſe. Some uſe a lozenge of ſugar, or a piece of thin linen cloth, rolled up with a little lard or ſalt-butter, which greatly looſens the belly.

For ulcers of the rectum, the beſt ſuppoſitories are made of honey of roſes, powder of maſtich and myrrh, or of colophony.

The ſtronger ſuppoſitories, which are compoſed of acrid and ſtimulating ingredients, are advantageouſly uſed in promoting a difficult birth, if the infant be in a natural poſition; and alſo for expelling the ſecundines, when they are tenaciouſly retained in the uterus.

In exhibiting them, the patient ſhould be put in the ſame poſture as in giving a clyſter, and the ſuppoſitory muſt be gently thruſt up the anus with the finger.

SUPPRESSION, in law, the extinction or annihilation of an office, right, rent, or the like.

SUPPRESSION, in grammar and rhetoric, denotes an omiſſion of certain words in a ſentence, which yet are neceſſary to full and perfect conſtruction: as, "I came from my father's;" that is, "from my father's houſe."

Suppreſſion is a figure of ſpeech very frequent in our language, chiefly uſed for brevity and elegance. Some rules relating hereto are as follow: 1. Whenever a word comes to be repeated in a ſentence oftener than once, it is to be ſuppreſſed: thus we ſay, "This is my maſter's horſe;" not "This horſe is my maſter's horſe." 2. Words that are neceſſarily ſupplied may be ſuppreſſed. 3. All words that uſe and cuſtom ſuppreſs in other languages, are alſo to be ſuppreſſed in Engliſh, unleſs there be particular reaſons for the contrary.

Suppreſſion is alſo a figure in ſpeech, whereby a perſon in rage, or other diſturbance of mind, ſpeaks not out all he means, but ſuddenly breaks off his diſcourſe: thus, the gentleman in Terence, extremely incenſed againſt his adverſary, accoſts him with this abrupt ſaying, "Thou of all." The exceſs of his indignation and rage choaked the paſſage of his voice, and would not ſuffer him to utter the reſt. But in theſe caſes, though the diſcourſe is not complete, the meaning is readily underſtood, and the evidence of the thought eaſily ſupplies the defect of words.

Suppreſſion, ſometimes, proceeds from modeſty, and fear of uttering any word of ill and offenſive ſound.

SUPPRESSION, in medicine, is generally uſed for a retenſion of urine or the menſes. See the articles DYSURY, ISCHURY, MENSES, &c.

SUPPRESSIONIS IGNIS, a fire of ſuppreſſion, a term uſed, in chemiſtry, to expreſs ſuch an application of fire to any ſubject that it ſhall at once act upon it, both above and below, in the ſame manner.

The uſual way of giving this heat is by covering the veſſel, in which the ingredients are put, with ſand, and then laying hot coals upon that, ſo that they may heat through the ſand downwards.

SUPPURATION, in medicine and ſurgery, the ſecond way wherein an inflammation terminates, being a converſion of the inſpiſſated blood and the ſoft adjacent parts, as the veſſels and fat, into pus, or matter: which diſorder, when it has not yet found an opening, is generally called an abſceſs.

The beſt cure of an inflammation is by reſolution or diſperſion: but when this is out of the power of the ſurgeon or phyſician to effect, and when tumours and phlegmons ſhew a tendency to ſuppuration, all the reſolving and diſperſing medicines muſt be laid aſide, and great care muſt be taken to forward the maturity of the inflammation; that is, to convert the ſtagnated blood into laudable matter; then to give a diſcharge, or vent, to this ſuppurated matter; afterwards to cleanſe the part; and finally to incarn and heal it.

In general, ſuppuration is to be promoted by ſuch of the emollient medicines as obſtruct the pores of the ſkin, as fat, oils, and glutinous medicines; as alſo the ſharp, pungent, and in ſome degree, cauſtic medicines, which may be uſed in form of cataplaſms or plaſters. But to be more particular, ſuppurating medicines, beſides thoſe already enumerated under abſceſs, &c. are the fats of a gooſe, of a dog, of a man, of a viper, and of a bear; pigeon and cow dung; bran, yeaſt, herrings, leeches, melilot, tobacco, oil, Burgundy-pitch, common-pitch, roſin, deer-ſuet, ox-ſuet, ſheep-ſuet, and frankincenſe. Theſe medicines, either alone or compounded, are to be applied hot to the part, and the application frequently repeated, till the matter within is found to be ſufficiently ripened by the ſoftneſs and whiteneſs of the tumour: but when the abſceſs is ſmall, it is ſufficient and more convenient to apply ſome of the ripening plaſters, as diachylon, with the gums, or the like, till the ſuppuration is perfected.

A ripening cataplaſm from the London diſpenſatory, is as follows: Take of figs, four ounces; yellow baſilicum ointment, one ounce; galbanum ſtrained, half an ounce: beat the figs thoroughly in a mortar, occaſionally dropping in ſome ſpirit of wine, or ſtrong ale; then carefully mix them with the ointment firſt liquified along with the galbanum. And a ripening plaſter from the Edinburgh diſpenſatory is this: Take of gum-plaſter, an ounce and a half;

half; Burgundy-pitch, half an ounce: boil them together.

In general, it is to be obſerved, that ſuppurative medicines are ſuch as by the activity and warmth of their parts, are able to penetrate the pores, and mix with and rariſy any obſtructed matter, ſo that it may be rendered fit to diſcharge, upon laying open the part by a cauſtic or inciſion.

Now, in many inſtances, as the matter by this means rariſies and grows more fluid, the refluent blood is apt to waſh it back into the common maſs, which ſometimes is of that nature as to do a great deal of miſchief; or by making it take up more room upon its rarefaction, occaſions it more to diſtend the parts in which it is contained, whereon a ſenſe of pain is excited, and thereby a greater concourſe of fluid, and conſequently a needleſs increaſe of the tumour; ſo that medicines under this denomination, require to be in the hand of ſuch as are ſo well acquainted with the mechaniſm of the animal œconomy, as to be able to apply them to the beſt advantage, and know how to avoid the hazards which may ariſe from their abuſe. Nor are internal remedies to be neglected, in order to further a ſuppuration, eſpecially when the tumour is large and of conſequence.

In theſe caſes, when the blood moves too ſlowly, which may be known by the pulſe, the patient muſt be allowed to eat meat, and muſt take ſuch medicines as are warm and ſtimulating, by means of which, and by the increaſed motion of the blood, the inſpiſſated particles contained in the ſmaller veſſels, will be the more eaſily converted in matter.

Strong broths are very proper for this purpoſe, as alſo the uſe of wine, or ale, in moderation; and Venice-treacle, diaſcordium, and the confection of alkermes, are to be the medicines taken three or four times a day, and medicated teas, made of ſaunders-wood, ſaſſafraſs, or cinnamon.

But on the contrary, when the motion of the blood is too violent, and the heat too great, cooling medicines are to be given, ſuch as the thin and watery drinks, the ſub-acid medicines, and nitre: bleeding, in a ſmall quantity, is alſo often neceſſary in this caſe.

But when the conſtitution is ſound, and the blood's motion regular, the uſe of internal medicines, to promote ſuppuration, is trifling, and may be altogether rejected. See the articles ABSCESS, TUMOUR, WOUND, &c.

SUPPURATIVES, or ſuppurating medicines, ſuch as promote ſuppuration. See the preceding article.

SUPPUTATION. See the article COMPUTATION.

SUPRACOSTALES, or *Levatores Coſtarum*, in anatomy, muſcles ſerving to reſpiration; being among thoſe that dilate the thorax for that end, and therefore reckoned among the dilatores. See the article DILATORES.

Theſe muſcles are of two kinds, being diſtinguiſhed from their figures into ſhort and long.

The ſhort ones are twelve on each ſide; they have their origin from the tranſverſe proceſſes of eleven vertebræ of the back, and of one that is in the lower one of the neck, and they are inſerted into the hinder part of the ribs.

The long ſupracoſtales are three or four; their origin is the ſame with the ſeventh, eighth, ninth, and tenth vertebræ, and their end in the ninth, tenth, eleventh, and twelfth ribs.

SUPRALAPSARY, in theology, a perſon who holds that God, without any regard to the good or evil works of men, has reſolved, by an eternal decree, to ſave ſome and damn others. Theſe are alſo called antelapſaries, and are oppoſed to ſublapſaries and infralapſaries.

SUPRASPINATUS, in anatomy, a muſcle thus called from its fleſhy origination at the upper end of the baſis of the ſcapula above the ſpine, to the upper part whereof it is connected, as alſo to the ſuperior edge of the ſcapula, whence marching along the upper interſcapulum, or thin part of the ſcapula, which it fills, it paſſes under the acromium and articulation of the humerus. It helps to lift the arm upwards.

SUPREMACY, in our polity, the ſuperiority or ſovereignty of the king over the church as well as ſtate, whereof he is eſtabliſhed head. See the article KING.

The king's ſupremacy was at firſt eſtabliſhed, or, as others ſay, recovered, by king Henry VIII. in 1534, after breaking with the pope. It is ſince confirmed by ſeveral canons, as well as by the articles of the church, and is paſſed into an oath which is required as a neceſſary qualification for all offices and employments both in church and ſtate, from perſons to be ordained, from the members of both houſes of parliament, &c.

SURA, in anatomy, the calf, or fleſhy part of the leg. The word is alſo uſed by ſome for the fibula, which ſee.

SURBATING, among farriers, is when the ſole of a horſe's foot is worn, bruiſed, or ſpoiled by beating the hoof againſt the ground in travelling without ſhoes, or going in hot ſandy lands, or with a ſhoe that hurts the ſole, lies too flat to it, or the like. Sometimes it alſo happens by over-riding a horſe while young, before his feet are hardened; and ſometimes by the hardneſs of the ground and high lifting his feet. The ſigns hereof are his halting on both fore-legs, and going ſtiffly, and creeping as if half foundered.

In the general, there is nothing better for ſurbated feet, than tar melted into the foot, or vinegar boiled with ſoot to the conſiſtence of a broth, and put

put into the foot boiling hot, with hurds over it, and ſplints to keep it in.

SURCHARGE, the ſame with overcharge, and whatever is above that which is juſt and right.

Surcharge of the foreſt, or a common, is when a commoner puts more beaſts in the foreſt, or common, than he has a right to do.

SURCINGLE, a girdle wherewith the clergy of the church of England uſually tie their caſſock.

SURCOAT, a coat of arms to be worn over the body armour.

The ſurcoat is properly a looſe thin taffety-coat, with arms embroidered or painted on it, ſuch as is worn by heralds: anciently alſo uſed by military men, over their armour, to diſtinguiſh themſelves by.

SURCULUS, in the anatomy of plants, a word uſed to expreſs that part of the branching of the ribs of a leaf, which is of a middle kind betwixt the great middle rib and the ſmalleſt reticular ramifications.

The middle rib is, by the writers on theſe ſubjects, called petiolum. The firſt diviſion that go off laterally from theſe are called rami, or branches; the next diviſion of theſe into more minute ones, ſurculi; and the final divarications of theſe, into the reticular work that ſpreads itſelf over the whole leaf, capillamenta. See PETIOLUM, &c.

SURD, in arithmetic and algebra, denotes any number or quantity that is incommenſurable to unity: otherwiſe called an irrational number or quantity.

The ſquare roots of all numbers, except 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, &c. (which are the ſquares of the integer numbers, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, &c.) are incommenſurables; and after the ſame manner the cube roots of all numbers but of the cubes of 1, 2, 3, 4, 5, 6, &c. are incommenſurables: and quantities that are to one another in the proportion of ſuch numbers, muſt alſo have their ſquare-roots, or cube-roots, incommenſurable.

The roots, therefore, of ſuch numbers, being incommenſurable, are expreſſed by placing the proper radical ſign over them: thus, $\sqrt[2]{2}$, $\sqrt[2]{3}$, $\sqrt[2]{5}$, $\sqrt[2]{6}$, &c. expreſs numbers incommenſurable with unity. However, though theſe numbers are incommenſurable themſelves with unity, yet they are commenſurable in power with it; becauſe their powers are integers, that is, multiples of unity.

They may alſo be commenſurable ſometimes with one another, as the $\sqrt[2]{8}$ and $\sqrt[2]{2}$; becauſe they are to one another as 2 to 1: and when they have a common meaſure, as $\sqrt[2]{2}$ is the common meaſure of both, then their ratio is reduced to an expreſſion in the leaſt terms, as that of commenſurable quantities, by dividing them by their greateſt common meaſure. This common meaſure is found as in commenſurable quantities, only the root of the common meaſure is to be made their common diviſor: thus, $\frac{\sqrt{12}}{\sqrt{3}} = \sqrt{4} = 2$, and $\frac{\sqrt{18a}}{\sqrt{2}} = 3\sqrt{a}$.

SURDESOLID, or SURSOLID. See the article SURSOLID.

SURETY, in law, generally ſignifies the ſame with bail. See BAIL.

SURFEIT, in medicine, a ſickneſs proceeding from the ſenſation of a load at the ſtomach, uſually attended with eruptions, and ſometimes with a fever.

SURGE, in the ſea language, the ſame with a wave. See WAVE.

Alſo when heaving at the capſtan, if the cable royal, or meſſenger ſlip a little, they call it ſurging.

SURGERY, or CHIRURGERY, χειρεργικυ, the art of curing all manner of wounds, and other diſorders, where the application of the hand, aſſiſted by proper inſtruments, is neceſſary.

SURIANA, in botany, a genus of plants, whoſe flower conſiſts of five oval patent petals the length of the cup, with five ſlender ſtamina, and the ſame number of germina, which become five roundiſh ſeed joined together.

SURMOUNTED, in heraldry, is when one figure is laid over another.

SURNAME, or SIRNAME, a name added to the proper or baptiſmal name, to denote the perſon of ſuch a family.

SURREJOINDER, is a ſecond defence of the plaintiff's declaration, by way of anſwer to the defendant's rejoinder.

SURRENDER, in common law, an inſtrument in writing, teſtifying, that the particular tenant of lands and tenements for life or years, doth ſufficiently conſent and agree, that he who has the next or immediate remainder or reverſion thereof, ſhall have the preſent eſtate of the ſame in poſſeſſion, and that he thereby yields and gives up the ſame to him.

SURROGATE, in law, denotes a perſon that is ſubſtituted, or appointed, in the room of another, and moſt commonly of a biſhop, or of his chancellor.

SURSOLID, or SURDESOLID, in arithmetic and algebra, the fifth power, or fourth multiplication of any number or quantity conſidered as a root. See ROOT.

SURVEY, in law, is the aſcertaining not only the boundaries and royalties of a manor, or eſtate in lands; but alſo the tenure of the reſpective tenants, and the rent and value of the ſame.

SURVEYOR, a perſon who hath the overſight and care of conſiderable works, lands, or the like.

SURVEYOR likewiſe denotes a gauger; as alſo a perſon who ſurveys lands, and makes maps of them.

SURVIVOR, in law, ſignifies the longeſt liver of joint-tenants, or of any two perſons, jointly intereſted in a thing; in which caſe, if there be only two joint-tenants, upon the death of one, the whole goes to the ſurvivor: and if there be more than two, the part of the deceaſed is divided among all the ſurvivors.

SUSPENSION, or *Points of* SUSPENSION, in mechanics, are thoſe points in the axis or beam of a ballance, wherein the weights are applied, or from which they are ſuſpended.

SUSPENSION *of Arms*, in war, a ſhort truce agreed on by both armies, in order to bury the dead, wait for freſh inſtructions, or the like.

SUTURE, *Sutura*, in anatomy, a kind of articulation peculiar to the cranium, or ſkull. See SKULL.

SUTURE, in ſurgery, a method of uniting the lips of wounds. See WOUND.

SWABBER, an inferior officer on board ſhips of war, whoſe employment it is to ſee that the decks are kept clean.

SWALLOW-TAIL, in fortification, the ſame with queue d'aronde. See QUEUE.

SWALLOW'S-TAIL, in carpentry and joinery. See DOVE-TAILING.

SWALLOW-WORT, *Aſclepias*, in botany See ASCLEPIAS.

SWAN, *Cygnus*, in ornithology. See the article CYGNUS.

SWARDY, in agriculture, an appellation given to lands well covered with graſs.

SWATH, *Faſcia*, in ſurgery, a long and broad bandage, for binding up any diſordered limb.

SWEAT, *Sudor*, a ſenſible moiſture iſſuing out of the pores of the ſkin of animals. See the article PERSPIRATION.

SWEATING SICKNESS. See the article SUDOR ANGLICANUS.

SWEET, in the wine trade, denotes any vegetable juice, whether obtained by means of ſugar, raiſins, or other foreign or domeſtic fruit, which is added to wines, with a deſign to improve them. See the article WINE.

SWEET-ALMONDS. See ALMONDS.

SWEET-GUM. See LIQUID AMBER.

SWEET-WILLIAM, in botany, the Engliſh name of a very beautiful ſpecies of dianthus. See DIANTHUS.

Sweet-Williams are propagated by ſeeds or ſlips; thoſe which are raiſed from ſeeds are beſt, not only for blowing ſtronger, but alſo for producing new varieties. The ſeaſon for ſowing it is in March; and when the plants are up two or three inches, they ſhould be planted out in beds at ſeven or eight inches aſunder; here they may remain till autumn, when they ſhould be tranſplanted where it is intended for them to blow, which will be in the ſucceeding ſummer.

SWERTIA, in botany, a genus of plants, whoſe flower conſiſts of a ſingle petal, with a plane limb divided into five lanceolated ſegments, and ten nectaria; the ſtamina are five ſubulated filaments, terminated with incumbent antheræ: the fruit is a cylindrical capſule pointed at each end, formed of two valves and one cell, which contains many ſmall ſeeds.

SWIETENIA, in botany, a genus of plants, whoſe flower conſiſts of five concave, obtuſe, patent petals, with a cylindric nectarium the length of the petals, and cut at its mouth into ten indentures; the ſtamina are ten very minute filaments, topped with oblong erect antheræ: the fruit is a large, woody, ovate capſule, having five cells, and opening at the baſe with five valves; the ſeeds are numerous, imbricated, compreſſed, oblong, and obtuſe.

SWIFTERS, in a ſhip, are ropes belonging to the fore and main ſhrouds, for ſecuring thoſe maſts.

SWIMMING, the art or act of ſuſtaining the body in water, and of moving therein; in which action the air-bladder and fins of fiſhes bear a conſiderable part.

SWINGLING, the beating of flax, or hemp, after it has been well broken with the brake; this is done by taking up the flax in handfuls, and then beating it with a rod, or flatted and ſmooth ſtick, in order to free it from the bun, and prepare it for being heckled. See the articles FLAX and HEMP.

SYCAMORE-TREE, in botany, the Engliſh name of the acer major, or greater maple. See the article MAPLE.

SYLLABLE, *συλλαβη*, in grammar, a part of a word, conſiſting of one or more letters, pronounced together. See the articles WORD and PRONUNCIATION.

SYLLABUS, in matters of literature, denotes a table of contents, or an index of the chief heads of a book or diſcourſe.

SYLLEPSIS, in Latin and Greek grammar, is the agreement of a verb or adjective, not with the word next it, but with the word moſt worthy in the ſentence.

SYLLOGISM, *συλλογισμος*, in logic, an argument or term of reaſoning, conſiſting of three propoſitions; the two firſt of which are called premiſes, and the laſt the concluſion. See the articles REASONING, PROPOSITION, &c.

SYMBOL, *συμβολον*, a ſign or repreſentation of ſomething moral, by the figures or properties of natural things.

SYMMETRY, *συμμετρια*, the juſt proportion of the ſeveral parts of any thing, ſo as to compoſe a beautiful whole.

SYMPATHETIC, ſomething that acts, or is acted on, by ſympathy: thus we ſay, ſympathetic diſeaſes, inks, powders, &c. See the article DISEASE, &c.

SYM-

SYMPATHY, *συμπαθεια*, an agreement of affections and inclinations, or a conformity of natural qualities, humours, temperaments, &c. which make two perſons delighted and pleaſed with each other.

SYMPHONY, *συμφωνια*, in muſic, properly denotes a conſonance or concert of ſeveral ſounds agreeable to the ear, whether vocal or inſtrumental, called alſo harmony. See the articles HARMONY and CONCERT,

SYMPHYSIS, in anatomy, one of the kinds of junctures, or articulations of the bones. See ARTICULATION.

SYMPHYTUM, comfrey, in botany, a genus of plants, whoſe flower is monopetalous and campanulated; the tube is very ſhort, and the limb is ventricoſely tubulated, with the mouth cut into five ſegments, which are reflexed and obtuſe: there is no pericarpium, but the cup contains four gibbous acuminated ſeeds, which join together at their tops.

The greater comfrey, called conſolida major, grows wild in divers parts of England: this has a thick fleſhy root, divided into ſeveral parts, black without, but white and clammy within: the lower leaves are hairy, large, ſharp pointed, and of a dark green colour: the ſtalk riſes to about two feet high, and are light, hairy, rough, and winged; theſe are terminated by looſe bunches of flowers, of a whitiſh colour, and blow in July.

The root of comfrey has the ſame qualities as marſh-mallow; it is recommended in ulcers of the lungs, and other diſorders that proceed from the acrimony of the humours: outwardly, it is ſaid to cure wounds, but is now ſeldom or never uſed for that purpoſe.

SYMPTOM, *συμπτωμα*, in medicine, any appearance in a diſeaſe, which ſerves to indicate or point out its cauſe, approach, duration, event, &c. See DISEASE, &c.

SYMPTOMATICAL, in medicine, is a term often uſed to denote the difference between the primary and ſecondary cauſes in diſeaſes.

SYNÆRESIS, *συναιρεσις*, contraction in grammar, a figure whereby two ſyllables are united as one; as *vemens*, for *vehemens*.

SYNAGOGUE, *Synagoga*, a particular aſſembly of Jews, met to perform the offices of their religion. Alſo the place wherein they meet.

SYNARTHROSIS, in anatomy, a ſpecies of articulation, wherein there is only an obſcure motion, as in the bones of the carpus and metacarpus, the tarſus and metatarſus, &c. or there is no motion at all, as in the ſutures of the ſkull, and articulations per harmoniam, or bare application. See CARPUS, &c.

SYNCOPE FAINTING, in medicine, a deep and ſudden ſwooning, wherein the patient continues without ſenſible heat, motion, ſenſe, or reſpiration, and is ſeized with a cold ſweat over the whole body, and all the parts turn pale and cold as if dead.

SYNGENESIA, from *συν*, together, and *γενεσις*, generation, the name of the nineteenth claſs in the Linnæan Syſtem of Botany; ſo called becauſe the antheræ (which are the part more immediately ſubſervient to generation) are in this claſs united in a cylinder, and perform their office together.

This claſs conſiſts of ſuch plants as bear compound flowers; the general characters are, the common cup is a perianthium, which contains the florets and the receptacle; it is either ſimple, augmented, or imbricated; it contracts when the flowers are fallen, but expands and turns back when the ſeeds are ripe.

The common receptacle of the fructification receives many ſeſſile florets on its diſc, and is of different forms. Some of the flowers in this claſs are,

1. Compoſed of tubuloſe hermaphrodite florets in the diſc, and of the ſame ſort in the radius.

2. Others are compoſed of tubuloſe hermaphrodite florets in the diſc, and of tubuloſe female florets in the radius.

3. Some are compoſed of tubuloſe hermaphrodite florets in the diſc, and of tubuloſe neutral florets in the radius.

4. Some have tubuloſe hermaphrodite florets in the diſc, and ligulated hermaphrodite florets in the radius.

5. Some are compoſed of tubuloſe hermaphrodite florets in the diſc, and of ligulated female florets in the radius.

6. Some are compoſed of tubuloſe hermaphrodite florets in the diſc, and ligulated neutral ones in the radius.

7. Some are compoſed of tubuloſe hermaphrodite florets in the diſc, and of naked and neutral florets in the radius.

8. Some are compoſed of tubuloſe male florets in the diſc, and of naked female ones in the radius.

And, 9. Some are compoſed of ligulated female florets in the diſc, and ligulated hermaphrodite ones in the radius.

The corollulæ are monopetalous and ſeated on the germina, and are either tubulated, ligulated, or tridentated: the ſtamina are five very ſhort filaments, inſerted in the neck of the corollulæ; the antheræ are of the ſame number, and are linear, erect, and grow together at their ſides, ſo as to form a tubulate cylindric body the length of the limb, and quinquedentated at the edge: the germen is oblong, and placed under the receptacle of the flower: the ſtyle is ſlender, erect, the length of the ſtamina, and perforates the cylinder formed by the antheræ: the ſtigma is divided into two parts, which ſtand open and bend backwards: there is no true pericarpium: the ſeed is ſingle, oblong, often tetragonal, but commonly narrow at the baſe.

In ſome genera they are crowned with down, but in

in others it is wanting; in ſome the downy matter is compoſed of a great number of ſingle ſhort threads placed circularly or otherwiſe; on the head of the ſeed, in ſome, the down is radiated, in others ramoſe or branched, and in ſome it is ſupported on a pedicle, while in others in ſtands immediately on the ſeed. In ſome genera the ſeeds have no down at all, but have a ſmall corona formed of what was originally the cup of the corollulæ, this is permanent, and divided uſually into five ſegments

In ſome genera the ſeed is wholly naked, having neither down or cup.

The genera of this claſs are very numerous, moſt of which are bitter and ſtomachic.

SYNTAX, *σύνταξις*, in grammar, the proper conſtruction, or due diſpoſition of the words of a language, into ſentences, or phraſes.

SYNTHESIS, in logic, denotes a branch of method oppoſite to analyſis, called the ſynthetic method. See METHOD.

SYRINGA, the lilac, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube of the corolla is cylindric and very long, and the limb is divided into four obtuſe plane ſegments; the ſtamina are two very ſhort filaments, topped with ſmall antheræ within the tube; the fruit is an oblong, compreſſed, acuminated capſule, having two cells, and opening with two valves, contrary to the partition, each cell containing an oblong, compreſſed, pointed ſeed, with a membranaceous margin.

The lilac is a common ſhrub, and much admired for the beauty of its leaves and fine bunches of flowers, which come out in May; it is eaſily propagated from ſuckers, in which it is very prolific, theſe may be taken off in autumn and planted where they are to remain.

SYRINGA, is a name more commonly applied to the philadelphus of Linnæus. See the article PHILADELPHUS.

SYRINGE, an inſtrument ſerving to imbibe, or ſuck in a quantity of any fluid, and to ſquirt or expel the ſame with violence.

SYRUP, or SYROP, in pharmacy, a ſaturated ſolution of ſugar, made in vegetable decoctions, or infuſions.

SYSSARCOSIS, in anatomy, a particular ſpecies of the kind of articulation, called alſo ſymphyſis.

SYSTEM, *Syſtema*, in general, denotes an aſſemblage or chain of principles and concluſions, or the whole of any doctrine, the ſeveral parts of which are bound together, and follow or depend on each other; in which ſenſe we ſay, a ſyſtem of philoſophy, a ſyſtem of divinity, &c.

SYSTEM, in botany, denotes the method of arranging and claſſing plants according to their ſimilitudes. The moſt celebrated ſyſtems of botany are thoſe of Tournefort and Linnæus; the ſexual ſyſtem of the latter appearing to be the moſt natural, is therefore followed by all the eminent botaniſts of this age. See the article BOTANY.

SYSTEM, in muſic. See the article INTERVAL.

SYSTOLE, in anatomy, the contraction of the heart, whereby the blood is drawn out of its ventricles into the arteries; the oppoſite ſtate to which is called the diaſtole, or dilatation of the heart.

SYZYGY, *Syzygia*, in aſtronomy, a term equally uſed for the conjunction and oppoſition of a planet with the ſun. See CONJUNCION.

T.

T.

T The nineteenth letter, and fifteenth conſonant, of our alphabet; the ſound of which is formed by a ſtrong expulſion of the breath through the mouth, upon a ſudden drawing back of the tongue from the fore part of the palate, the lips being at the ſame time open.

Among the ancients, T. as a numeral, ſtood for one hundred and ſixty; and with a daſh over it, thus $\overline{T}$, it ſignified one hundred and ſixty thouſand. In muſic, T ſtands for tutti, all, or altogether.

TABBY, in commerce, a kind of rich ſilk, which has undergone the operation of tabbying. See the next article.

TABBYING, the paſſing a ſilk or ſtuff under a calender, the rolls of which are made of iron or copper, variouſly engraven, which bearing unequally on the ſtuff, renders the ſurface thereof unequal, ſo as to reflect the rays of light differently, making the repreſentation of waves thereon.

TABELLA, tablet, in pharmacy, is much the ſame with troches and lozenges, being a ſolid preparation formed into a little cake, or maſs, of different figures, intended to diſſolve ſlowly, and generally made agreeable to the palate.

TABERNACLE, among the Hebrews, a kind of building in the form of a tent, ſet up, by expreſs command of God, for the performance of religious worſhip, ſacrifices, &c. during the journeying of the Iſraelites in the wilderneſs; and after their ſettlement in the land of Canaan, made uſe of for the ſame purpoſe till the building of the temple of Jeruſalem.

TABERNÆMONTA, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube of the corolla is long and cylindric, and the limb is divided into five obtuſe oblique ſegments: the ſtamina are five ſmall filaments, topped with connivent antheræ: the fruit is compoſed of two folicles, which are ventricoſe, acuminated, and horizontally reflexed, formed of one valve, and containing one cell, which is filled with a number of oblong, oval, obtuſe, ruff ſeeds, placed in an imbricated manner, and ſurrounded with a pulp.

The ſpecies of this genus being natives of the Weſt-Indies, and conſequently impatient of cold, they therefore require a hot-houſe in this climate for their preſervation.

TABES DORSALIS, in medicine, a diſtemper which, according to a late author, is a particular ſpecies of a conſumption, the proximate cauſe of which is a debility of the nerves. See the article CONSUMPTION.

Of the ſeveral kinds of conſumptions incident to human bodies, the tabes dorſalis is the ſloweſt in its progreſs, but the moſt melancholy in its circumſtances; and, unleſs timely obviated, for the moſt part fatal.

This diſeaſe is only incident to young men of ſalacious diſpoſitions, and proceeds from too early venery, an immoderate uſe of it, or pollutions. It ſeems, therefore, to derive its origin from too frequent venereal ſpaſms; and the immoderate loſs of ſeminal fluid has a conſiderable ſhare in producing the effect.

The ſymptoms of the tabes dorſalis are involuntary, nocturnal, ſeminal emiſſions, a pain in the back, and often in the head, a formication of the ſpine, an aching pain, rolling and hanging down of the teſticles, a weakneſs of memory and ſight, and a mucous diſcharge from the urethra, eſpecially after ſtraining at the diſcharge of the excrements. The mucous diſcharge here mentioned, is called by Hippocrates, liquidum ſemen, but it is nothing but the mucous of the proſtrate gland.

This diſeaſe is farther attended with great melancholy and dejection of mind, and a gutta ſerena often follows. The eyes grow hollow, the viſage meagre and thin, the body emaciated and weak, a

pitation of the heart, and ſhortneſs of breath, ſucceed with a concourſe of hectical complaints, ending in death.

For the cure of this diſtemper, a regularity of the non-naturals is of the utmoſt importance. Good air, rather cool than hot, is of great uſe. As to diet, high-ſeaſoned meats, ſpirituous and fermented liquors, ſhould be avoided. No food is ſo beneficial as milk: chocolate is alſo eſteemed good, in ſuch quantities as to ſit eaſy on the ſtomach. Animal food of eaſy digeſtion, at dinner, does no harm. Suppers ſhould be avoided, at leaſt milk only ſhould be then taken, about two hours before going to bed. Sleep muſt be little, and in due ſeaſon; that is, the patient ſhould go to bed and riſe early. Indulgence in bed in a morning is hurtful. The general rule ſhould be to riſe immediately upon waking; which, though irkſome at firſt, will by cuſtom be made familiar and agreeable. Moderate exerciſe, or ſuch as the patient's ſtrength will admit of, without wearineſs, ought to be uſed. Some recommend riding, eſpecially a long journey, by ſuch daily portions as to avoid extraordinary fatigue. The ſecretions of the body, if out of order, ſhould be regulated, and the patient ſhould be entertained with cheerful company.

As to medicines, the claſſes of balſamics and aſtringents are chiefly uſeful. Among the latter, the Peruvian bark, either in ſubſtance, extract, or tincture, the acid elixir of vitriol, and the tincture ſaturnia, or anti-phthyſica, are the moſt efficacious. Strengthening plaſters may alſo be laid on the loins; and, chief of all, the cold bath ſhould be uſed.

TABLE, *Tabula*, a moveable piece of furniture, uſually made of wood or ſtone, and ſupported on pillars, or the like, for the commodious reception of things placed thereon.

TABLE, in architecture, a ſmooth ſimple member, or ornament, of various forms, but moſt uſually in that of a long ſquare.

TABLE, in perſpective, denotes a plain ſurface, ſuppoſed to be tranſparent, and perpendicular to the horizon.

It is always imagined to be placed at a certain diſtance between the eye and the objects, for the objects to be repreſented thereon by means of the viſual rays paſſing from every point thereof through the table to the eye; whence it is called perſpective plane.

TABLES *of the Law*, in Jewiſh antiquity, two tables, on which were written the Decalogue, or Ten Commandments, given by God to Moſes on Mount Sinai. See the article DECALOGUE.

TABLE, among the jewellers. A table-diamond, or other precious ſtone, is that whoſe upper ſurface is quite flat, and only the ſides cut in angles; in which ſenſe, a diamond, cut table-wiſe, is uſed in oppoſition to a roſe-diamond.

TABLE, in mathematics, a ſyſtem of numbers calculated to be ready at hand for the expediting aſtronomical, geometrical, and other operations: thus we ſay, tables of the ſtars; tables of ſines, tangents, and ſecants; tables of logarithms, rhumbs, &c. ſexagenary tables; loxodromic tables, &c.

Aſtronomical TABLES, are computations of the motions, places, and other phænomena of the planets, both primary and ſecondary.

TABLE, in heraldry. Coats or eſcutcheons containing nothing but the mere colour of the field, and not charged with any bearing or moveable, are called *tables d'attente*, tables of expectation, or *tabulæ raſæ*.

TABLET, *Tabella*, in pharmacy. See the article TABELLA.

TABOR, *Tabourin*, a ſmall drum. See the article DRUM.

TABORITES, or THABORITES, a branch or ſect of the ancient Huſſites.

They carried the point of reformation farther than Huſs had done, rejected purgatory, auricular confeſſion, the unction of baptiſm, tranſubſtantiation, &c. They reduced the ſeven ſacraments of the Romaniſts to four, viz. baptiſm, the euchariſt, marriage, and ordination.

TACAMAHACA, is the gum of a tall tree, the manner of its growth much reſembling the poplar, of which, till lately, it has been held a ſpecies: its leaves are for the moſt part heart-ſhaped, but ſome are oval, and others are lanceolated; they are whitiſh on their under ſide, and of a dark green on the upper: the flowers are male and hermaphrodite, produced on the ſame plant, but are not particularly deſcribed by botaniſts.

Tacamahaca is of a fragrant and peculiar ſmell, and is of two kinds; the one, called the ſhell-tacamahaca, which is the fineſt; the other, which is an inferior kind, being termed rough-tacamahaca, or tacamahaca in grains.

Some greatly commend tacamahaca in diſorders of the breaſt and lungs; but at preſent it is very rarely uſed internally. Externally, however, it is in repute for ſoftening tumours, and mitigating pain and aches. Applied to the navel, it is ſaid to relieve women in hyſteric complaints; and applied in the ſame manner to the region of the ſtomach, it aſſiſts digeſtion, and expels flatuſes: it is alſo an ingredient in ſome of the ſhop-compoſitions.

TACK, in a ſhip, a great rope having a wale knot at one end, which is ſeized or faſtened into the clew of the ſail; ſo is reefed firſt through the cheſſe-trees, and then is brought through a hole in the ſhip's ſide.

Its uſe is to carry forward the clew of the ſail, and to make it ſtand cloſe by a wind: and whenever the ſails are thus trimmed, the main-tack, the fore-tack, and the mizen-tack, are brought cloſe by the

the board, and haled as much forward as they can be.

TACK-ABOUT, in the ſea language, is to turn the ſhip about, or bring her head about, ſo as to lie the contrary way.

TACKLE, or TACKLING, among ſea-men, denotes all the ropes or cordage of a ſhip, uſed in managing the ſails, &c.

In a more reſtrained ſenſe, tackles are ſmall ropes running in three parts, having at one end a pendant and a block; and at the other end, a block and hook, to hang goods upon that are to be heaved into the ſhip or out of it.

TACTICS, in the art of war, is the method of diſpoſing forces to the beſt advantage in order of battle, and of performing the ſeveral military motions and evolutions.

TÆNIA, in architecture, a member of the Doric capital, reſembling a ſquare fillet, or reglet: it ſerves inſtead of a cymatium.

TAFFAREL, in a ſhip, the uppermoſt rail or frame, abaft over the poop. See the article SHIP.

TAFFETY, in commerce, a fine ſmooth ſilken ſtuff, remarkably gloſſy.

There are taffeties of all colours, ſome plain, and others ſtriped with gold, ſilver, &c. others chequered, others flowered, &c. according to the fancy of the workmen. See SILK.

TAGETES, the African, or French-marigold, a genus of plants, whoſe flower is compound and radiated, conſiſting of hermaphrodite florets, which form the diſc, and female ligulated corollulæ, which compoſe the rays: there is no pericarpium; but the ſeeds, which are linear and compreſſed, are contained in the cup.

This genus is one of the fineſt autumnal beauties which the flower-garden is ornamented with: the plants are raiſed from ſeeds, which ſhould be ſown in March on a ſlight hot-bed, and afterwards planted where they are intended to flower.

TAIL, *Cauda*, the train of a beaſt, bird, or fiſh; which, in land animals, ſerves to drive away flies, &c. and in birds and fiſhes, to direct their courſe, and aſſiſt them in aſcending and deſcending in the air or water.

TAIL *of a Comet*, denotes the luminous rays iſſuing from a comet towards that part of the heavens from whence it ſeems to move. See COMET.

TAIL *of the Trenches*, in the art of war, is the poſt or place where the beſiegers begin to break ground.

Dragon's TAIL, in aſtronomy, the deſcending node of a planet. See NODE.

TAIL, or FEE-TAIL, in law, is a limited eſtate, or fee; oppoſed to fee-ſimple. See FEE.

Fee-tail is an inheritance whereof a perſon is ſeiſed, to him and the heirs of his body, begotten or to be begotten; ſo that the tenant in tail cannot alien, either before or after iſſue had, or forfeit ſuch lands, longer than for his own life; becauſe an eſtate in tail always remains to the iſſue of the donee and his heirs; or in caſe he has no iſſue, than to the donor and his heirs.

Eſtates-tail of lands are either general or ſpecial. General tail is where lands or tenements are given to a man or woman, and the heirs of either of their bodies begotten; which is called a general tail, becauſe, however many wives a perſon that holds by this title ſhall have one after another in lawful marriage, his iſſue by them ſeverally are all capable of inheriting in their turns: and if the woman has iſſue by ſeveral huſbands, they may all inherit after each other, as heirs of her body. A tail ſpecial, on the other hand, is when lands, &c. are limited to a man and his wife, and the heirs of their two bodies begotten, ſo that the children by a ſecond wife, or former wife, ſtand abſolutely excluded.

TALC, or TALK, in natural hiſtory, a large claſs of foſſil bodies, compoſed of broad, flat, and ſmooth laminæ or plates, laid evenly and regularly on one another; eaſily fiſſile, according to the ſite of theſe plates, but not all ſo in any other direction; flexile and elaſtic; bright, ſhining, and tranſparent; not giving fire with ſteel, nor fermenting with acid menſtrua, and ſuſtaining the force of a violent fire without calcining.

TALENT, money of account amongſt the ancients. See the articles COIN and MONEY.

Amongſt the Jews, a talent in weight was equal to 60 maneh, or 113 lb. 10 oz. 1 dwt. $10\frac{5}{7}$ gr.

TALISMANS, magical figures cut or engraved with ſuperſtitious obſervations on the characteriſms and configurations of the heavens, to which ſome aſtrologers have attributed wonderful virtues, particularly that of calling down celeſtial influences.

There have been ſome rabbins who maintained, that the braſen ſerpent raiſed by Moſes, was a taliſman.

TALK, or TALC, in natural hiſtory. ſee the article TALC.

TALLOW, in commerce, the fat of certain animals, melted down and clarified, ſo as to be fit for making candles, &c.

TALLOW-TREE, a remarkable tree growing in great plenty in China; ſo called, from its producing a ſubſtance like tallow, which ſerves for the ſame purpoſe; it is about the height of a cherry-tree, its leaves in form of a heart, of a deep ſhining red colour, and its bark very ſmooth. Its fruit is incloſed in a kind of pod, or cover like a cheſnut, and conſiſts of three round white grains, of the ſize and form of a ſmall nut, each having its peculiar capſula, and within a little ſtone. This ſtone is encompaſſed by a white pulp which has all the properties of true tallow, both as to conſiſtence, colour, and even ſmell; and accordingly the Chineſe make their candles of it; which would doubtleſs be as good as thoſe in Europe, if they knew how to purify

purify their vegetable, as well as we do our animal, tallow.

All the preparation they give it, is to melt it down and mix a little oil with it, to make it ſofter and more pliant. It is true their candles made of it yield a thicker ſmoke, and a dimmer light, than ours; but theſe defects are owing in a great meaſure to the wicks, which are not of cotton, but only a little rod, of dry light wood covered with the pith of a ruſh wound round it; which, being very porous, ſerves to filtrate the minute parts of the tallow, attracted by the burning ſtick, which by this means is kept alive.

TALLY, in law, a piece of wood cut in two parts, whereon accounts were anciently kept, by means of notches; one part of the tally being kept by the debtor, and the other by the creditor.

TALMUD, or THALMUD, among the Jews, a collection of the doctrines of their religion and morality. It is the *corpus juris*, or body of the laws and cuſtoms of the Jews, who eſteem it equal to the Scriptures themſelves.

TALON, in architecture, a kind of moulding, which conſiſts of a cymatium, crowned with a ſquare fillet; frequently found to terminate joiners-work, as thoſe of doors, windows, &c.

TALUS, in anatomy, the ſame with the aſtragalus. See ASTRAGALUS.

TALUS, or TALUT, in architecture, the inclination or ſlope of a work; as of the outſide of a wall, when its thickneſs is diminiſhed by degrees, as it riſes in height to make it the firmer.

TALUS, in fortification. Talus of a baſtion, or rampart, is the ſlope or diminution allowed to ſuch a work, whether it be of earth or ſtone, the better to ſupport its weight.

The exterior talus of a work, is its ſlope on the ſide towards the country; which is always made as little as poſſible, to prevent the enemies ſcalado; unleſs the earth be bad, and then it is abſolutely neceſſary to allow a conſiderable talus for its parapet. The interior talus of a work is its ſlope on the inſide towards the place.

TAMARINDUS, the tamarind-tree, in botany; the ſtem grows to a large ſize, and is covered with a brown bark; it divides into many branches at the top, which ſpread wide on every ſide, and are cloſely furniſhed with winged leaves, each compoſed of ſixteen or eighteen pair of folioles, and terminating with an odd one; theſe are ſmall, a little hairy, and ſit cloſe to the midrib. The flowers are produced on the ſide of the branches, in looſe bunches of five or ſix together, each flower conſiſts of five ovate papilionaceous petals, with three ſubulated ſtamina placed in the ſinuſes of the cup. The fruit is a long, thick, compreſſed pod, having a double ſkin and one cell, containing three or four ſmooth, angular, and compreſſed ſeeds, which are ſurrounded with an acid ſtringy pulp of a dark colour.

Tamarinds are brought from Egypt and the Eaſt and Weſt-Indies; the pods, membranes, nerves, and ſeeds, mixed together. They may be propagated in this country, by ſowing the ſeeds on a hot-bed in the ſpring, and when the plants are come up, ſhould be planted ſingly in pots, and plunged in the bark bed in the ſtove, where they muſt be conſtantly kept; and, when properly managed, will ariſe to the hight of three feet the firſt ſummer.

The pulp, which is the only part uſed in medicine, is of a cooling nature, it gently relaxes the bowels, temperates the acrimony of the humours, and is good in acute burning fevers; it ſerves to correct the faults of violent purgatives, and quickens thoſe that are ſluggiſh; it is alſo recommended in diarrhœas and nephretic complaints, and is ſaid to cure the jaundice without the aſſiſtance of any other medicine.

TAMARISK, *Tamariſcus*, or *Tamarix*, in botany, a genus of plants, whoſe flower conſiſts of five ovate, concave, obtuſe, patent petals, diſpoſed in the form of a roſe; the ſtamina are five capillary filaments, topped with roundiſh antheræ; the germen is acuminated, and crowned with three oblong, feathery, twiſted ſtigmas: the fruit is an oblong, triquetous, acute pointed capſule, having one cell and three valves, and contains many ſmall pappoſe ſeeds.

There are two ſpecies belonging to this genus, one a native of France and the other of Germany; they are both deciduous, and are frequently planted among other ſhrubs in the pleaſure garden. Their propagation here is either by layers or cuttings, which is performed in autumn.

The wood, bark, and leaves of theſe trees, are accounted ſpecific for all diſorders of the ſpleen, and to attenuate groſs humours; but in the preſent practice are but little uſed.

TAMBOUR, in architecture, a term applied to the Corinthian and Compoſite capitals, as bearing ſome reſemblance to a drum, which the French call tambour.

TAMBOUR is alſo uſed for a little box of timber-work covered with a ceiling, within-ſide the porch of certain churches, both to prevent the view of perſons paſſing by, and to keep off the wind, &c.

TAMBOUR alſo denotes a round courſe of ſtone, ſeveral whereof form the ſhaft of a column, not ſo high as a diameter.

TAMPION, or TOMPION, among gunners, a plug to ſtop the mouths of cannons, mortars, &c. to keep them clean within.

TAMUS, black-briony, in botany, a genus whoſe flowers are male and female, and produced on ſeparate plants, neither having any corolla; the cup

cup of the male flower is divided into ſix parts, and contains the ſame number of ſtamina; the cup of the female flower is monophyllous, campanulated, and patent, and divided into ſix lanceolated ſegments, with oblong punctuated nectaria placed on the inſide of its edges; the fruit is an ovate, trilocular berry, containing two globoſe ſeeds.

TAN, the bark of the oak, chopped and ground, in a tanning-mill, into a courſe powder, to be uſed in the tanning of leather.

New tan is the moſt eſteemed; for when old and ſtale, it loſes a great deal of its effects, which conſiſts in condenſing and cloſing the pores of the ſkin, ſo that the longer the ſkins are kept in tan, the greater ſtrength and firmneſs they acquire. In effect, not only the bark, but every part of the oak-tree, of what age and growth ſoever, and all oaken coppice, &c. cut in barking-time, make good tan, as good at leaſt as the beſt bark. This when got, is to be well dried in the ſun, houſed dry, and kept ſo. When it is to be uſed, the greater wood muſt be ſhaved ſmall, or cut for the tan engine, and the ſmaller bruiſed, or cut ſmall by the engine, after which it muſt be dried on a kiln, &c.

TAN, among gardeners, for the uſe of which ſee the articles BARK, FORCING, HOT-HOUSE, &c.

TANACETUM, *Tanſey*, in botany, a genus of plants, whoſe flower is compound, tubuloſe, and convex, and contained in an hemiſpherical imbricated cup; the corollulæ of the diſc are hermaphrodite, funnel-ſhaped, and quinquifid at the limb; the female florets which compoſe the rays are trifid and deeply divided within; there is no pericarpium, but the ſeeds, which are ſolitary, oblong, and naked, are contained in the cup, and placed on a convex, naked receptacle.

The common tanſey grows wild in many parts of England, and is alſo cultivated in gardens; the root is long, woody, fibrous, and perennial; the ſtalks ariſe to the height of two or three feet, they are ſtreaked, a little hairy, and pithy; the leaves are large, long, winged, ſerrated on their edges, and diſpoſed in pairs along the midrib, and terminated with an odd one. The flowers grow in umbels on the extremities of the ſtalks, they are of a yellow colour, and come out in July.

The leaves of tanſey have an acrid, bitter, aromatic taſte, and are looked upon as ſtomachic, febrifuge, and ſudorific, as well as anthelmintic, for both the leaves and ſeeds have always been accounted good to kill worms; it is therefore often ſubſtituted inſtead of worm-ſeed, but is not ſo efficacious.

TANGENT, in geometry, is defined, in general, to be a right-line, which touches any arch of a curve in ſuch a manner, that no right line can be drawn through betwixt the right line and the arch, or within the angle that is formed by them.

The tangent of an arch is a right-line drawn perpendicularly from the end of a diameter, paſſing to one extremity of the arch, and terminated by a right-line drawn from the center through the other end of the arch, and called the ſecant. See SECANT and SINE.

And the co-tangent of an arch, is the tangent of the complement of that arch. See ARCH and COMPLEMENT.

The tangent of a curve is a right-line which only touches the curve in one point, but does not cut it.

TANNER, one who dreſſes hides, &c. by tanning them. See the next article.

TANNING, the preparing of ſkins or hides in a pit, with tan and water, after the hair has been firſt taken off, by putting the ſkins into lime water. See the articles SKIN, HIDE, &c.

Method of TANNING *Oxen Hides.* The ſkin being flayed off the carcaſe, if it is intended to be kept, is ſalted with ſea-ſalt and alum, or with a coarſe kind of ſalt-petre. If it is not for keeping, the ſalting is ſaved, as being of no uſe but to prevent the hide from corrupting before it can be conveniently carried to the tan-houſe. Whether the hide have been ſalted or not, the tanner begins with taking off the horns, the ears, and the tail, after which it is thrown into a running water for about thirty hours, to waſh off the blood and other impurities adhering to the inſide. This done it is laid over-night in a lime-pit, already uſed, whence it is taken and left to drain three or four days on the edge of the pit. The firſt and ſlighteſt preparation over, it is retained in a ſtrong lime-pit for two days, then taken out for four days more; and thus for ſix weeks alternately, it is taken out and put in twice a week. At the ſix weeks end it is put into a freſh pit, where it continues eight days, and is then taken out for ſo many, and thus alternately for a year or eighteen months, according to the ſtrength of the leather and the weather; for in great heats they put in freſh lime twice a week; and in froſt they ſometimes do not touch them for three months. Every freſh lime-pit they throw them into, is ſtronger and ſtronger. At the end of four, five, or ſix weeks, the tanner ſcrapes off the hair on a wooden leg or horſe, with a kind of knife made for that purpoſe. And after a year or eighteen months, when the hair is perfectly gone, he carries it to a river to waſh, pares off the fleſh on the leg with a kind of cutting-knife, and rubs it briſkly with a ſort of whetſtone, to take off any remains of fleſh or of filth on the ſide of the hair. The ſkin is now put in tan, that is, it is covered with tan as it is ſtretched in the pit, and water is let in upon it; if the ſkin is ſtrong, five coverings of tan will be

 required;

required; for weaker, three or four may ſuffice. When the ſkin has not been kept long enough in lime, or in the tan-pit, upon cutting it in the middle, there appears a whitiſh ſtreak, called the horn or crudity of the ſkin, and it is this crudity that is the reaſon why the ſoles of ſhoes, boots, &c. ſtretch ſo eaſily and take water. When the hides are ſufficiently tanned, they are taken out of the pit to be dried, by hanging them in the air; then the tan is cleared off them, and they are put into a place neither too dry nor two moiſt; they are there well ſtretched over one another with weights a-top, to keep them tight and ſtrait; and in this condition are ſold under the denomination of bend-leather. This is the method of tanning bullocks or oxen hides. Cows, calves, and horſes ſkins are tanned much after the ſame manner of thoſe of oxen, except that they are only kept four months in the lime-pit, and that before they be put in the tan, there is a preparation required thus: cold water is poured into a wooden vat, or tub, wherein the ſkins are put, which are kept ſtirring while ſome other water is warming in a kettle; and as ſoon as that water is little more than luke-warm, it is poured gently into the vat, and upon this is caſt a baſket of tan; during which time the ſkins are ſtill kept turning, that the water and tan may not ſcorch them. After an hour they are taken out and caſt for a day into cold water, then returned to the former vat and the ſame water they had been in before, and here they are left for eight days; which expired, they are put into the tan-pit, and three coverings of tan given them; the firſt of which laſts five weeks, the ſecond ſix, and the third two months. The reſt of the proceſs is the ſame in all reſpects as that delivered above.

TANSEY, *Tanacetum*, in botany. See the article TANACETUM.

TANTALUS's CUP, in hydraulics, a ſiphon ſo adapted to a cup, that the ſhort leg being in the cup, the long leg may go down through the bottom of the cup. See the article SIPHON.

This bended ſiphon is called Tantalus's cup, from the reſemblance of the experiment made with an image in the glaſs, repreſenting Tantalus in the fable, fixed up in the middle of the cup with a ſiphon concealed in his body, beginning in the bottom of his feet, and aſcending to the upper part of his breaſt; there it makes a turn, and deſcends through the other leg, on which he ſtands; and from thence down through the bottom of the cup, where it runs out, and cauſes the water to ſubſide in the cup; as ſoon as it riſes to the height of the ſiphon, or to the chin of the image, the water will begin to run through the ſiphon concealed in the figure, till the cup is emptied.

TANTAMOUNT, ſomething that amounts, or is equivalent, to ſome other.

TAP, among hunters, an hare is ſaid to tap or beat, when ſhe makes a particular noiſe at rutting-time.

TAP-ROOT, among gardeners, that part of the root that deſcends ſtraight down.

TAPESTRY, or TAPISTRY, a curious kind of manufacture, ſerving to adorn a chamber or other apartment, by covering or lining the walls thereof. It is a kind of woven hangings of wool and ſilk, frequently raiſed and inriched with gold and ſilver, repreſenting figures of men, animals, landſkips, hiſtories, &c.

The invention of tapeſtry ſeems to have come to us from the Levant; and this ſeems the more probable, in that the workmen concerned in it were called, at leaſt in France, Sarraſins, or Sorroſinois.

It is ſuppoſed that the Engliſh and Flemiſh, who were the firſt that excelled in making tapeſtry, might bring the art with them from ſome of the croiſades, or expeditions againſt the Saracens. Be this as it will, it is certain that theſe two nations, eſpecially the Engliſh, were the firſt who ſet on foot this noble and rich manufacture in Europe, now one of the fineſt ornaments of palaces, churches, &c. and therefore if they may not be allowed the inventors, they have at leaſt the glory of being the reſtorers of this ſo curious and admirable an art, as gives a kind of life to wools and ſilks, in no reſpect inferior to the paintings of the beſt maſters.

Tapeſtry-work is diſtinguiſhed by the workmen into two kinds, viz. that of high and that of low warp; though the difference is rather in the manner of working than in the work itſelf; which is in effect the ſame in both; only the looms, and conſequently the warps, are differently ſituated. Thoſe of the low warp being placed flat and parallel to the horizon; and thoſe, on the contrary, of the high warp, erected perpendicularly. The Engliſh anciently excelled all the world in the tapeſtry of the high warp, and they ſtill retain their former reputation, though with ſome little change: their low warps are ſtill admired; but, as for the high ones, they are quite laid aſide by the French.

The French have three conſiderable tapeſtry-manufactures beſides that of the Gobelins; the firſt at Aubuſſon in Auvergne, the ſecond is at Felletin in the Upper Marche, and the third at Beauvais. They were all equally eſtabliſhed for the high and low warp; but they have all laid aſide the high warp, excepting the Gobelins. There are admirable low warps in Flanders, generally exceeding thoſe of France; the chief and almoſt only Flemiſh manufactures are at Bruſſels, Antwerp, Oudenard, Liſle, Tournay, Bruges, and Valenciennes.

The uſual widths of tapeſtries are from two ells to three ells Paris-meaſure.

The Manufacture of TAPESTRY *of the High Warp.*

The loom, whereon it is wrought, is placed perpendicularly:

pendicularly: it conſiſts of four principal pieces; two long planks or cheeks of wood, and two thick rollers or beams. The planks are ſet upright, and the beams acroſs them, one at the top, and the other at the bottom, or about a foot diſtance from the ground. They have each their trunnions, by which they are ſuſpended on the planks, and are turned with bars. In each roller is a groove from one end to the other, capable of containing a long round piece of wood, faſtened therein with hooks. The uſe of it is to tie the ends of the warp to. The warp, which is a kind of worſted, or twiſted woollen thread, is wound on the upper roller; and the work, as faſt as wove, is wound on the lower. Withinſide the planks, which are ſeven or eight feet high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, ſerving to ſuſtain the coat-ſtave; theſe pieces of iron have alſo holes pierced, by putting a pin in which, the ſtave is drawn nearer or ſet further off; and thus the coats or threads are ſtretched or looſened at pleaſure. The coat-ſtave is about three inches diameter, and runs all the length of the loom; on this are fixed the coats or threads, which make the threads of the warp croſs each other. It has much the ſame effect here, as the ſpring-ſtave and treddles have in the common looms. The coats are little threads faſtened to each thread of the warp with a kind of ſliding knot, which forms a ſort of maſh or ring. They ſerve to keep the warp open for the paſſage of broaches wound with ſilks, woollens, or other matters uſed in the piece of tapeſtry. In the laſt place, there are a number of little ſticks of different lengths, but all about an inch in diameter, which the workman keeps by him in baſkets, to ſerve to make the threads of the warp croſs each other, by paſſing them acroſs: and, that the threads thus croſſed may retain their proper ſituation, a packthread is run among the threads, above the ſtick.

The loom being thus formed, and mounted with its warp, the firſt thing the workman does, is to draw on the threads of this warp, the principal lines and ſtrokes of the deſign to be repreſented on the piece of tapeſtry; which is done by applying cartoons, made from the painting he intends to copy, to the ſide that is to be the wrong ſide of the piece, and then, with a black-lead pencil, following and tracing out the contours thereof on the thread of the right ſide; ſo that the ſtrokes appear equally both before and behind.

As for the original deſign the work is to be finiſhed by, it is hung up behind the workmen, and wound on a long ſtaff, from which a piece is unrolled from time to time, as the work proceeds.

Beſides the loom, &c. here deſcribed, there are three other principal inſtruments required for working the ſilk or the wool of the woof within the threads of the warp; theſe are a broach, a reed, and an iron needle.

The broach is made of a hard wood, ſeven or eight inches long, and two thirds of an inch thick, ending in a point with a little handle. This ſerves as a ſhuttle; the ſilks, woollens, gold, or ſilver to be uſed in the work, being wound on it.

The reed or comb is alſo of wood, eight or nine inches long, and an inch thick on the back, whence it grows leſs and leſs to the extremity of the teeth, which are more or leſs apart, according to the greater or leſs degree of fineneſs of the intended work. Laſtly, the needle is made in form of the common needle, only higher and longer. Its uſe is to preſs cloſe the wool and ſilks when there is any line or colour that does not fit well.

All things being prepared for the work, and the workman ready to begin, he places himſelf on the wrong ſide of the piece, with his back towards the deſign; ſo that he works as it were blind-fold, ſeeing nothing of what he does, and being obliged to quit his poſt, and go to the other ſide of the loom, whenever he would view and examine the piece, to correct it with his preſſing needle. To put ſilk, &c. in the warp, he firſt turns and looks at the deſign, then, taking a broach full of the proper colours, he places it among the threads of the warp, which he brings croſs each other with his fingers, by means of the coats or threads, faſtened to the ſtaff; this he repeats every time he is to change his colour. Having placed the ſilk or wool, he beats it with his reed or comb; and when he has thus wrought in ſeveral rows over each other, he goes to ſee the effects they have, in order to reform the contours with his needle, if there be occaſion. As the work advances, it is rolled upon the lower beam, and they unrol as much warp from the upper beam, as ſuffices them to continue the piece: the like they do of the deſign behind them. When the pieces are wide, ſeveral workmen may be employed at once.

We have but two things to add: the firſt is, that the high warp tapeſtry goes on much more ſlowly than the low-warp, and takes up almoſt twice the time and trouble. The ſecond is, that all the difference that the eye can perceive between the two kinds, conſiſts in this, that in the low-warp there is a red fillet, about one twelfth of an inch broad, running on each ſide from top to bottom, which is wanting in the high-warp.

The Manufacture of TAPESTRY *of the Low Warp.*

The loom or frame wherein the low-warp is wrought, is much like that of the weavers; the principal parts thereof are two ſtrong pieces of wood, forming the ſides of the loom, and bearing a beam or roller at each end; they are ſuſtained at bottom with other long pieces of wood, in manner of treſſels: and, to keep them the firmer, are likewiſe faſtened to the floor, with a kind of buttreſſes, which prevent any ſhaking, though there are ſometimes

times four or five workmen leaning on the beam at once. The rollers have each their trunnions, by which they are ſuſtained; they are turned by large iron pins, three feet long. Along each beam runs a groove, in which is placed the wich, a piece of wood about two inches diameter, and almoſt the length of the roller. This piece fills the groove intirely, and is faſtened therein, from ſpace to ſpace, by wooden pins. To the two wiches are faſtened the two extremities of the warp, which is wound on the further roller, and the work, as it advances, on the nearer. Acroſs the two ſides, almoſt in the middle of the loom, paſſes a wooden bar, which ſuſtains little pieces of wood, not unlike the beam of a ballance: to theſe pieces are faſtened ſtrings, which bear certain ſpring ſtaves, wherewith the workman, by means of two treddles under the loom, on which he ſets his feet, gives a motion to the coats, and makes the threads of the warp riſe and fall alternately. Each loom has more or fewer of theſe ſpring-ſtaves, and each ſtaff more or fewer coats, as the tapeſtry conſiſts of more or fewer threads. The deſign or painting the tapeſtry-man is to follow, is placed underneath the warp, where it is ſuſtained from ſpace to ſpace with ſtrings, by which the deſign is brought nearer to the warp. The loom being mounted, there are two inſtruments uſed in working of it, viz. the reed and the flute.

The flute does the office of the weaver's ſhuttle: it is made of a hard poliſhed wood, three or four lines thick at the ends, and ſomewhat more in the middle, and three or four inches long. On it are wound the ſilks, or other matters, to be uſed as the woof of the tapeſtry, repreſented. The comb, or reed, is of wood or ivory: it has uſually teeth on both ſides; it is about an inch thick in the middle, but diminiſhes each way to the extremity of the teeth; this ſerves to beat the threads of the woof cloſe to each other, as faſt as the workman has paſſed and placed them, with his flute, among the threads of the warp.

The workman is ſeated on a bench before the loom, with his breaſt againſt the beam, only a cuſhion or pillow between them; and in this poſture ſeparating with his fingers the threads of the warp, that he may ſee the deſign underneath; and taking a flute, wound with the proper colour, he faſtens it among the threads, after having raiſed or lowered them, by means of the treddles, moving the ſpring ſtaves and coats.

Laſtly, to preſs and cloſe the threads of the ſilk or yarn, &c. thus placed, he ſtrikes each courſe (i. e. what the flute leaves in its paſſing and coming back again) with the reed.

That which is very remarkable in the manufacture of the low-warp, and which is common to it with the high, is, that it is all wrought on the wrong ſide; ſo that the workman cannot ſee the right ſide of his tapeſtry until the piece is finiſhed, and taken out of the loom.

TAPLINGS, in the Engliſh ſalt-works, the name given to certain bars of iron, which ſupport the bottom of the pan in which the brine is boiled. See the article SALT.

TAPPING, in agriculture, is the making an inciſion in the bark of a tree, and letting out the juice.

To tap a tree at the root, is to open it round about the root.

One of the moſt effectual ways of tapping, ſo as to obtain the greateſt quantity of ſap, and that in the ſhorteſt time, is not only to pierce the bark, or to cut the body of the tree almoſt to the pith with a chiſſel, but to bore through all the circles on both ſides the pith, leaving only the outermoſt circle and the bark on the north-eaſt ſide unpierced.

This hole is to be bored ſloping upwards, as large as the largeſt auger will make; and that alſo through and under a large arm near the ground; and thus it will not need any ſtone to keep open the orifice, nor tap to direct the ſap into the receiver.

TAR, a thick, black, unctuous ſubſtance, obtained from old pines and fir-trees, by burning them with a cloſe ſmothering heat: for the method of obtaining which, and the uſe of it in coating and caulking ſhips, &c. ſee the article PITCH.

With regard to the medical uſes of tar, it may be obſerved, that it differs from the native reſinous juice of trees, in having received a diſagreeable impreſſion from the fire, and containing a portion of the ſaline and other juices, united with the reſinous and oily; by the mediation of theſe, a part of the terebinthinate oil proves diſſoluble in aqueous liquors, which extract little or nothing from the purer turpentines.

Water impregnated with the more ſoluble parts of tar, proves, in conſequence of this hot pungent oil, warm and ſtimulating: it ſenſibly raiſes the pulſe, and quickens the circulation. By theſe qualities, in cold, languid, phlegmatic habits, it ſtrengthens the ſolids, attenuates viſcid juices, opens obſtructions of the minuter veſſels, and promotes perſpiration and the fluid ſecretions in general; whilſt in hot bilious temperaments, it diſpoſes to inflammation, and aggravates the complaints which it has been employed to remove.

Tar-water has lately been recommended to the world as a certain and ſafe medicine in almoſt all diſeaſes; a ſlow, yet effectual, alternative in cachexies, ſcurvies, chlorotic, hyſterical, hypochondriacal, and other chronical complaints; and a ſudden remedy in acute diſtempers, which demand immediate relief, as pleuriſies, peripneumonies, the ſmall-pox, and all kinds of fevers in general.

This medicine, though inferior to the character given it, is, doubtleſs, in many caſes, of conſiderable utility. It ſenſibly raiſes the pulſe, and occa-

ſions ſome conſiderable evacuations, generally by perſpiration or urine, though ſometimes by ſtool or vomit: hence it is ſuppoſed to act by encreaſing the vis vitæ, and enabling nature to expel the morbific humours.

We ſhall here inſert, from the firſt public recommender of this liquor, Biſhop Berkley, ſome obſervations on the manner of uſing it: Tar-water, when right, is not paler than French, nor deeper than Spaniſh white-wine, and full as clear; if there be not a ſpirit very ſenſibly perceived in drinking, you may conclude the tar-water is not good. It may be drank either cold or warm; in cholics it is judged to be beſt warm. As to the quantity, in common chronical indiſpoſitions, a pint a day may ſuffice, taken on an empty ſtomach, at two or four times, to wit, night and morning, and about two hours after dinner and breakfaſt: more may be taken by ſtrong ſtomachs. But thoſe who labour under great and inveterate maladies, muſt drink a greater quantity, at leaſt a quart every twenty-four hours: all of this claſs muſt have patience and perſeverance in the uſe of this, as well as of all other medicines, which, though ſure, muſt yet, in the nature of things, be ſlow in the cure of inveterate and chronical diſorders. In acute caſes, and fevers of all kinds, it muſt be drank in bed, warm, and in great quantity (the fever ſtill enabling the patient to drink) perhaps a pint every hour; which has been known to work ſurpriſing cures. But it works ſo quick, and gives ſuch ſpirits, that the patients often think themſelves cured before the fever hath quite left them.

Tar-pills are directed, in the Edinburgh Diſpenſatory, to be prepared as follows: Take of tar, any quantity at pleaſure, mix it with as much elecampane-root as will reduce it into a proper thickneſs for being formed into pills. The powder here mixed with it, though of no great virtue, is, nevertheleſs, a very uſeful addition, not only for procuring it a due conſiſtence for taking, but likewiſe, as it divides the glutinous texture of the tar, and thus prevents its adhering to the inteſtines, and promotes its ſolubility in the animal juices. Each dram of the maſs is formed into twelve pills, ſix of which are taken every morning and evening, in diſorders of the breaſt, phthiſes, ſcurvies, &c. They are far more different in quality from tar-water than might be at firſt expected; that nauſeous draught has little heat, pungency, and bitterneſs: the water extracting only a ſmall quantity of the hot oil, which becomes ſoluble by the mediation of the acid, produced in the preparation of the tar.

Some have imagined this acid to be the oily ſubſtance that gives virtue to tar-water; and hence have endeavoured to introduce an acid ſpirit, obtained from tar by diſtillation; but the effects of this, and all other acids, are directly contrary to thoſe experienced, either from tar-water, or tar given in ſubſtance.

Barbadoes-tar is nearly of the conſiſtence of common tar, and of a reddiſh black colour, and diſagreeable ſmell. This bitumen is found in ſeveral of our American iſlands, where it is eſteemed, by the inhabitants, of great ſervice as a ſudorific, and in diſorders of the breaſt and lungs; though in caſes of this kind, attended with inflammation, it is certainly improper. They alſo apply it externally as a diſcutient, for preventing paralytic diſorders. Among us it is rarely uſed, and not often to be met with genuine. The college employ it as a menſtruum for ſulphur, in the Barbadoes balſam of ſulphur; and direct an oil to be diſtilled from it.

TARANTISMUS, in medicine, the diſeaſe or affection of thoſe bit by the tarantula.

The patients under this malady are denominated tarantati. See the next article.

TARANTULA, in the hiſtory of inſects, a ſpecies of araneus, with an oval hairy body and thick legs. See the article ARANEUS.

This is one of the large ſpiders, but is not the very largeſt known: its body is three quarters of an inch long, and of the thickneſs of one's little-finger: it is uſually of an olive brown, variegated with a duſkier colour; but in this it varies greatly: it is covered with a ſhort and ſoft down, or hairineſs; the points of its forceps are very fine and ſharp: this ſpecies is a native of Apulia.

As to the effects of the poiſon they convey into the wound they make, there ſeems yet room for much explanation about it. We are told, that in the ſummer months, eſpecially when the heats are greateſt (as in the dog-days) the tarantula, creeping among the corn in the fields, bites the mowers and paſſengers: that in the winter it lurks in holes, and is ſcarcely ſeen; and that, if it bites then, it is not ſo venomous, neither does it induce any ill ſymptoms: but in hot weather, according to Dr. Mead, although the pain of its bite is at firſt no greater than what is cauſed by the ſting of a bee, yet the part is quickly after diſcoloured with a livid, black, or yellowiſh circle, and raiſed to an inflamed ſwelling; the patient, within a few hours, is ſeized with a violent ſickneſs, difficulty of breathing, univerſal faintneſs, and ſometimes trembling, with a weakneſs in the head; and on being aſked his ailment, with a tremulous voice, and melancholy look, points to his breaſt, as if the heart was moſt affected: the patient grows by degrees more melancholy, ſtupid, and ſtrangely timorous, and in a ſhort time expires, unleſs muſic is called to his aſſiſtance, which alone, without the help of medicines, is ſaid to perform the cure, the uſual alexipharmics and cordial medicines, being of no ſervice.

At the firſt ſound of the muſical inſtrument, although the ſick lie as it were in an apoplectic

fit, they begin, by degrees, to move their hands and feet, till at laſt they get up, and fall to dancing, with wonderful vigour at firſt, for three or four hours; then they are put to bed, refreſhed from their ſweating a ſhort time, and repeat their exerciſe with the ſame vehemence, perceiving no wearineſs or weakneſs from it, but profeſſing that they grow ſtronger and nimbler the more they dance.

At this ſport they uſually ſpend twelve hours a day, and it continues three or four days, by which time they are freed from all their ſymptoms; which, nevertheleſs, attack them about the ſame time next year; and if they do not take care to prevent this relapſe by muſic, they fall into the jaundice, want of appetite, univerſal weakneſſes, and ſuch like diſeaſes, which are every year encreaſed if dancing be neglected, till at laſt they prove incurable.

As muſic is the common cure, ſo they who are bitten are pleaſed, ſome with one ſort of it, and ſome with another; one is pleaſed with a pipe, another with a timbrel; one with a harp, and another with a fiddle; ſo that the muſicians ſometimes make ſeveral eſſays before they can accommodate their art to the venom: but this is conſtant and certain, notwithſtanding this variety, that they all require the quickeſt tunes; and are never moved by a ſlow dull harmony.

While the tarantati are dancing, they loſe in a manner the uſe of all their ſenſes, are like ſo many drunkards, do many ridiculous and fooliſh tricks, talk and act obſcenely and rudely, take great pleaſure in playing with vine-leaves, with naked ſwords, red cloaths, and the like; and, on the other hand, cannot bear the ſight of any thing black, ſo that if any by-ſtander happen to appear in that colour, he muſt immediately withdraw, otherwiſe they relapſe into their ſymptoms with as much violence as ever.

Baglivi, who reſided in Italy (and probably had good opportunities of informing himſelf with reſpect to this inſect) has written a treatiſe expreſsly upon the ſubject: and moſt medicinal writers mention the diſtempers ariſing from the bite thereof, as a thing certain.

But, notwithſtanding all theſe great authorities, there is good reaſon to believe the whole ſtory fabulous, and a vulgar error; for it is treated as ſuch by an Italian phyſician, in the Philoſ. Tranſact. and a great many gentlemen of unqueſtionable veracity, who reſided at Taranto many months, and during the time in which the bite of a tarantula is ſaid to be moſt pernicious, affirm, that there was not a phyſician in the country, who believed there ever was ſuch a diſtemper, from ſuch a cauſe: that among the vulgar there is a tradition, that diſtempers attended with very extraordinary circumſtances, had been excited by the bite of a tarantula; but that nobody ever remembers a ſingle inſtance; and that there is no other ſpider to be found in that country, different from thoſe which are common in moſt warm countries.

TARCHONANTHUS, in botany, a genus of plants, whoſe flowers are compound and uniform, and contained in a turbinated cup; the proper flower is hermaphrodite, monopetalous, and funnel-ſhaped: the ſeeds are ſolitary, of an oblong figure, topped with down, and contained in the cup.

TARCHONANTHUS, is alſo a name uſed by Vaillant for the iva of Linnæus. See the article IVA.

TARE, is an allowance for the outſide package, that contains ſuch goods as cannot be unpacked without detriment; or for the papers, threads, bands, &c. that incloſe or bind any goods imported looſe; or, though imported in caſks, cheſts, &c. yet cannot be unpacked and weighed net.

Several ſorts of goods have their tares aſcertained, and thoſe are not to be altered or deviated from, in any caſe, within the port of London; unleſs the merchant, thinking himſelf or the officers of the crown, to be prejudiced by ſuch tares, ſhall deſire that the goods may be unpacked, and the net-weight taken; which may be done either by weighing the goods in each reſpective caſk, &c. net; or (as is practiſed in Eaſt-India goods particularly) by picking out ſeveral caſks, &c. of each ſize, and making an average, compute the reſt accordingly. But this muſt not be done without the conſent of two ſurveyors, atteſted by their hands in the land-waiter's books; and in the out-ports, not without the conſent of the collector and ſurveyor. And to thoſe goods which have not their tares aſcertained, two ſurveyors in London, and the collector and ſurveyor in the out-ports, are to adjuſt and allow the ſame, in like manner.

Sometimes the caſks, &c. are weighed beyond ſea, before the goods are put in; and the weight of each reſpective caſk, &c. marked thereon (as is uſual for moſt goods imported from the Britiſh plantations) or elſe inſerted in the merchant's invoice; in which caſe, if the real invoice be produced, and the officers have ſatisfied themſelves (by unpacking and weighing ſome of them) that thoſe weights are juſt and true, they do then, after having reduced them to Britiſh weight, eſteem them to be real tares, and paſs them accordingly.

But the unpacking goods, and taking the net-weight, being ſuppoſed the juſteſt method, both for the crown and merchant, it is uſually practiſed in the port of London, in all caſes where it can be done with conveniency, and without detriment to the goods.

TARE, in botany, a ſpecies of viſia. It is an annual plant; the root is ſlender and fibrous, with weak, angular, hairy, and hollow ſtalks; the leaves

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are compoſed of ſeveral pair of blunt hairy folioles, and terminated with a tendril, which lays hold on any thing next it for its ſupport; the flowers are papilionaceous, and of a purple or bluiſh colour; theſe are ſucceeded by hairy erect pods, containing in each, three or four round ſeeds.

This plant is ſowed in the fields almoſt all over Europe, for provender for cattle, either when the plant is green or dried; alſo the ſeeds of the latter, pigeons and hogs are very fond of.

In medicine, tares are reckoned diaphoretic, and are ſometimes uſed in cataplaſms to ſoften, reſolve, and ſtrengthen.

TARGIONIA, in botany, a genus of cryptogamious plants, the flower-cup of which is almoſt globular, and conſiſts of two valves; and the anthera is ſeſſile, campanulated, and placed in the bottom of the cup.

TARGUM, a name whereby the Jews call the Chaldee paraphraſes, or expoſitions, of the Old Teſtament, in the Chaldee language.

TARIF, or TARIFF, a table or catalogue, containing the names of different ſorts of merchandize, with the duties to be paid, as ſettled by authority, among trading nations.

TARPAULIN, a piece of canvas well tarred over, to keep off the rain from any place.

The term is alſo often applied, in a burleſque ſenſe, to a perſon that has been all his life bred to the ſea.

TARPEIAN, in Roman antiquity, an appellation given to a ſteep rock in Rome; whence, by the law of the twelve tables, thoſe guilty of certain crimes were precipitated.

TARPEIAN GAMES, the ſame with thoſe otherwiſe called capitoline. See CAPITOLINE GAMES.

TARSO, in the glaſs-trade, a white kind of ſtone, uſed inſtead of ſand, for the fineſt cryſtal glaſs. See the article GLASS.

TARRAGON, in botany, the Engliſh name for a ſpecies of artemiſia. See ARTEMISIA.

The leaves ſomewhat reſemble thoſe of hyſſop, and are of a dark-green colour, and the flowers grow on the tops of the branches in bunches.

The whole plant is very acrimonious, and is aperient, diuretic, and proper to open obſtructions: by ſome it is mixed with ſalads, to correct the coldneſs and crudities of other herbs, and becauſe it is good for cold ſtomachs.

TARSUS, in anatomy, the ſpace between the bones of the leg and the metatarſus, wherein are contained ſeven bones, viz. the aſtragalus, calcaneum, os naviculare, os cuboides, and the three oſſa cuneiformia. See the articles ASTRAGALUS, CALCANEUM, &c.

TARTANE, in naval architecture, a kind of bark, uſed in the Mediterranean, for fiſhing and carriage.

It has only a main maſt and a mizzen; its ſails are triangular; and when a ſquare ſail is put up, it is called a ſail of fortune.

TARTAR, in natural hiſtory and pharmacy, a hard and almoſt ſtony ſeparation from a vegetable juice, after fermentation.

The common tartar is the produce of wine, being found in large maſſes, adhering to the bottoms and ſides of the caſks, in which that liquor has been long kept. We meet with it in large maſſes of an irregular figure, and more or leſs denſe texture, without ſmell, and of a ſubacid taſte.

The common crude tartar is of two kinds, the white and the red; this difference of colour, being owing to that of the wine they are produced from, is of little conſequence in itſelf, but it is an indication of more eſſential differences in the matter.

The white tartar is much more pure and clean than the red, and is, though equally hard, conſiderably leſs heavy. We have this principally from Germany, where it is, at times, cleared off from the ſides of very large veſſels, in which they keep their white-wines for many years.

The red tartar is brought in large quantities from Italy, and ſome parts of France. The white tartar is to be choſen for medicinal uſe, and particularly ſuch as is of a compact texture, not ſpungy or cavernous, when broken, and free from dirt, or other foulneſſes, and ſuch as has a ſort of cryſtallizations on its ſurface.

Tartar is, properly ſpeaking, the eſſential ſalt of the grape.

Tartar contains a large portion of acid ſalt, and of an oil, in part thin and limpid, in part thick and coarſe. It affords a ſmall portion of a volatile alkali ſalt in diſtillation, and the reſiduum yields a very large proportion of fixed alkali.

It is to be obſerved, that both theſe alkalies ſeem, in ſome degree, creatures of the fire; for neither of them manifeſt themſelves either by their taſte or qualities in the tartar, any more than in many other ſubſtances, which yet afford much of them by analyſis, till they have felt the operation of the fire.

Tartar diſſolves in boiling water, but with great difficulty in cold; and even when purified, and brought to the ſtate of what we call cryſtal, or cream of tartar, it retains the ſame quality.

Tartar is ſcarce ever given internally in its crude ſtate. The preparations now in uſe are the following:

Cryſtals of TARTAR. Powder a quantity of white tartar, and boil it in a ſufficient portion of water till it be in a great part diſſolved, the foulneſs only remaining behind. Pour this decoction, while hot, through a flannel bag, let it ſtand till cold, and there will be cryſtals formed at the ſides of the veſſel; theſe are the cryſtals of tartar. They may be

be diſſolved by boiling a ſecond time, and ſet to ſhoot again, and by this means they will be rendered the more pure. The French, who prepare great quantities of theſe cryſtals about Montpelier, firſt diſſolve a ſmall quantity of white earth of the nature of chalk, in the water in which they are to be boiled, for the ſecond ſolution. This earth renders the water milky, but the cryſtals ſhoot perfectly clear in in, and whatever foulneſs they carried with them at their firſt ſhooting, will be, by this means, more perfectly ſeparated from them.

It was formerly a cuſtom to ſeparate firſt the ſalt which ſhot to the top of the liquor in form of a thin ſkin or film, and this was ſuppoſed purer than the reſt, and called cream of tartar; but it is wholly the ſame with the cryſtals that ſhoot to the ſides of the veſſel, and nobody now trouble themſelves to keep it ſeparate.

The cryſtals of tartar, or, as we commonly expreſs it, cream of tartar, is a gentle purge; it attenuates and reſolves tough humours, and is good againſt obſtructions of the viſcera, and againſt cachectic complaints.

Fixed Salt of TARTAR. Take any quantity of tartar at pleaſure, put it into a crucible, and calcine it for eight hours in an open fire; then pour boiling water on it, and ſet it over the fire till all the ſalt be diſſolved. Filtre the ſolution, and evaporate it to a dryneſs in a ſand-heat; there will remain, at the bottom of the veſſel, a white fixed alkaline ſalt. If it is not ſo pure as it ought to be, diſſolve it in fair water; filtre the ſolution, and evaporate it to a dryneſs as before; after which it may be calcined for half an hour in a crucible; it will then be perfectly pure, and muſt then be kept in a phial cloſe ſtopped, for it eaſily melts if the air comes to it.

If this ſalt be expoſed to a damp air, as in a vault, or other ſuch place, in a flat earthen veſſel, it runs into a heavy liquor, which is to be filtered, to ſeparate it from any foulneſs it may have accidentally contracted, and is the oleum tartari per deliquium.

The fixed ſalt of tartar is very acrid and cauſtic; ſome attribute great virtues to it, as a diuretic; and our apothecaries too frequently uſe it in the place of ſalt of wormwood. They, indeed, buy it as ſuch; and what is yet more unfair in the ſeller, is, what he calls by either of theſe names of ſalt of tartar or ſalt of wormwood, as it is more or leſs purified, is often not truly either, but is prepared from the common Ruſſia pot-aſh, diſſolved and purified. This fixed alkali is of great uſe in opening the bodies of reſinous and ſulphureous ſubjects, and making them yield a ſtronger tincture to ſpirit of wine, or water, than they otherwiſe would do. It is often mixed alſo with purges to quicken the operation. Caution ought to be taken, when it is given internally, either that it be firſt diſſolved by an acid, as in the ſaline draughts; or elſe blended with a large quantity of liquor, to prevent its proving too acrid as it paſſes the œſophagus.

Tincture of Salt of TARTAR. Put a quantity of ſalt of tartar into a good crucible; ſet it in an open fire, and calcine it for ſome hours, raiſing the fire, at laſt, to ſuch a degree as to make the ſalt ready to melt; then pour it into a clean marble mortar, grind it ſome time, and while yet hot, put it into a matraſs heated beforehand; pour a quart of rectified ſpirits of wine on four ounces of this calcined ſalt, and let it ſtand in a ſand-heat three or four days, in which time, if the proceſs have been rightly managed, the ſpirit will become of a ſtrong yellowiſh colour, and is then to be filtered off for uſe.

People who make this tincture, find it difficult to give the ſpirit the true colour. This tincture is attenuant and reſolvent, given from ten to thirty drops: it is alſo of great uſe in extracting the tinctures of vegetable and mineral ſubſtances, which would not impart any colour to ſimple ſpirit of wine.

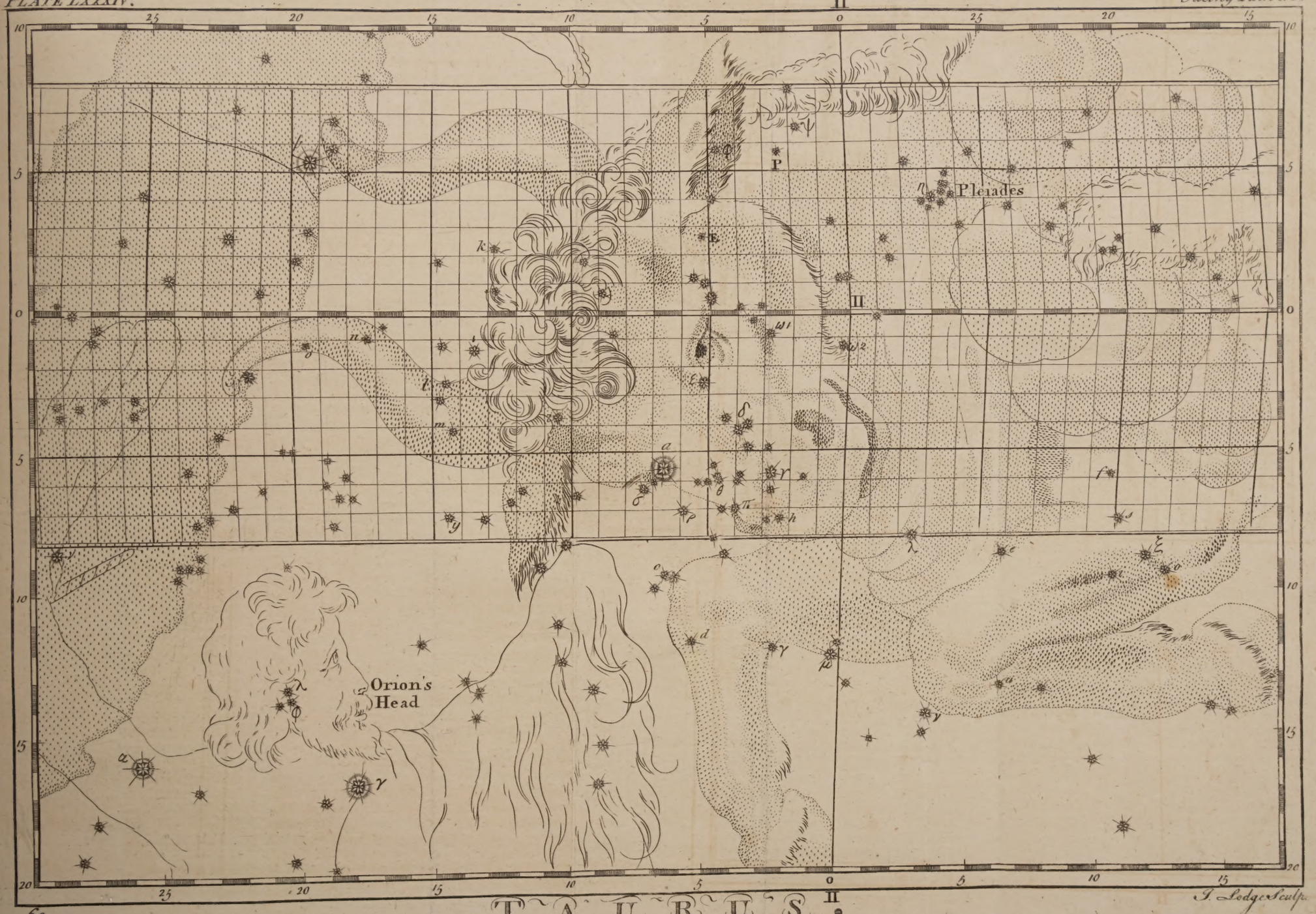
Foliated TARTAR, or *Regenerated* TARTAR. Take any quantity of dry ſalt of tartar powdered, put it into a large glaſs veſſel, and pour thereon, by degrees, as much ſpirit of vinegar as will ſaturate the ſalt; filtre the fluid, and evaporate it over a gentle fire to dryneſs, taking great care that the matter does not contract any empyreuma. On the ſalt which remains after this evaporation, pour out as much freſh vinegar as will again ſaturate it; then filtre the fluid, and carefully dry it by evaporation.

This ſalt has a febrifuge and deobſtruent quality. The doſe may be from ten grains to one ſcruple, to be taken in a glaſs of water, and repeated every fourth or ſixth hour, according to the exigence of the caſe.

Emetic TARTAR, a preparation of antimony with tartar. See ANTIMONY.

Soluble TARTAR is thus made: Diſſolve a pound of fixed alkaline ſalt in a gallon of boiling-water, and gradually throw in cryſtals of tartar as long as a freſh addition thereof raiſes any effervescence, which generally ceaſes before three pounds of the cryſtals have been uſed: then filtre the liquor; and, after due evaporation, ſet it by to cryſtallize. This ſalt has been long eſteemed both as a medicine and a menſtruum: it is aperient, attenuates viſcid juices, promotes the urinary ſecretion, and gently looſens the belly: the doſe is from ten grains to a dram or two, or more. It is alſo uſed as an addition to the reſinous purgatives, as it promotes their action, and at the ſame time prevents their griping quality.

Vitriolated TARTAR is ordered, by the College of London phyſicians, to be made thus: Diſſolve eight ounces of green vitriol in four pints of boiling water; and while the liquor continues boiling,



T A U R U S.

J. Lodge Sculp.

throw into it ſalt of tartar, or any other alkaline ſalt, till no effervescence ariſes upon throwing in a freſh addition, which generally happens when four ounces, or a little more of the ſalt have been uſed: filtre the liquor through paper, and after due evaporation ſet it by to cryſtallize.

Vitriolated tartar is aperient, exhibited in ſmall doſes of a ſcruple, or half a dram, attenuates viſcid juices, and promotes the fluid ſecretion. In large doſes it proves a mild and ſafe cathartic.

TASSEL, a ſort of pendant ornament at the corners of a cuſhion, or the like.

In building, taſſels denote thoſe pieces of board that lie under the ends of the mantle-trees.

TASTE, in phyſiology, a peculiar ſenſation excited by means of the organs of taſte, viz. the papillæ of the tongue. See the article TONGUE.

The taſtes of bodies depend on a certain determinate magnitude of their particles, adapted to excite different ſenſations by means of the papillæ of the tongue.

Savours, which are the objects of the taſte in general, proceed chiefly from the ſaline parts, which are found in all matters, whether animal or vegetable, which we take either as food or phyſic. Theſe little angular pungent bodies are fitter than others to penetrate even to the immediate organ, and to make themſelves perceived there: we may judge of them by putting a grain of pure ſalt, of any kind whatever, upon the tongue, where it will make a very ſtrong impreſſion; and their analyſis diſcovers, that, of all mixed bodies, thoſe that affect the organ moſt, are ſuch as abound moſt in ſalts. See the article SALT.

TATIANITES, in church-hiſtory, Chriſtian heretics in the ſecond century; ſo called from their leader Tatian, a diſciple of St. Juſtin.

This hereſiarch took from Valentinus the fable of the Æons, and from Marcion the doctrine of two principles. But what particularly diſtinguiſhed his followers was, their condemning of marriage, and forbidding the eating of fleſh or drinking of wine.

TAT-TOO, q. d. TAP-TO, a beat of a drum at night, to adverti ſe the ſoldiers to retreat or repair to their quarters in their garriſon, or to their tents in a camp.

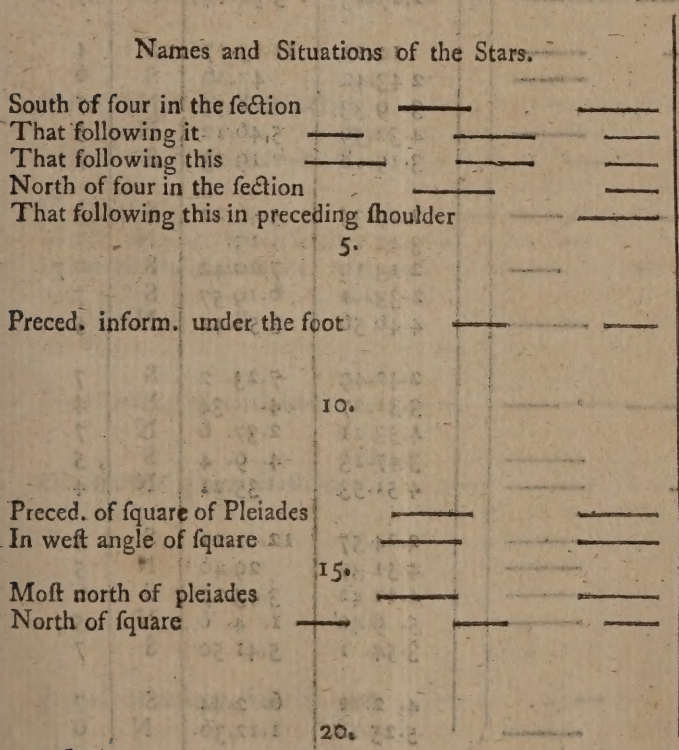
TAUGHT, or TAU'T, in the ſea-language, ſignifies the ſame as ſtiff, or faſt: thus, to ſet taught the ſhrouds, or ſtays, is to make them more tight and ſtiff.

TAUNT, or TAUNT-MASTED, is ſaid of a ſhip whoſe maſts are too tall for her.

TAURUS, the bull, in zoology. See the article BULL.

TAURUS, in aſtronomy, the bull, one of the twelve ſigns of the zodiac, and the ſecond in order.

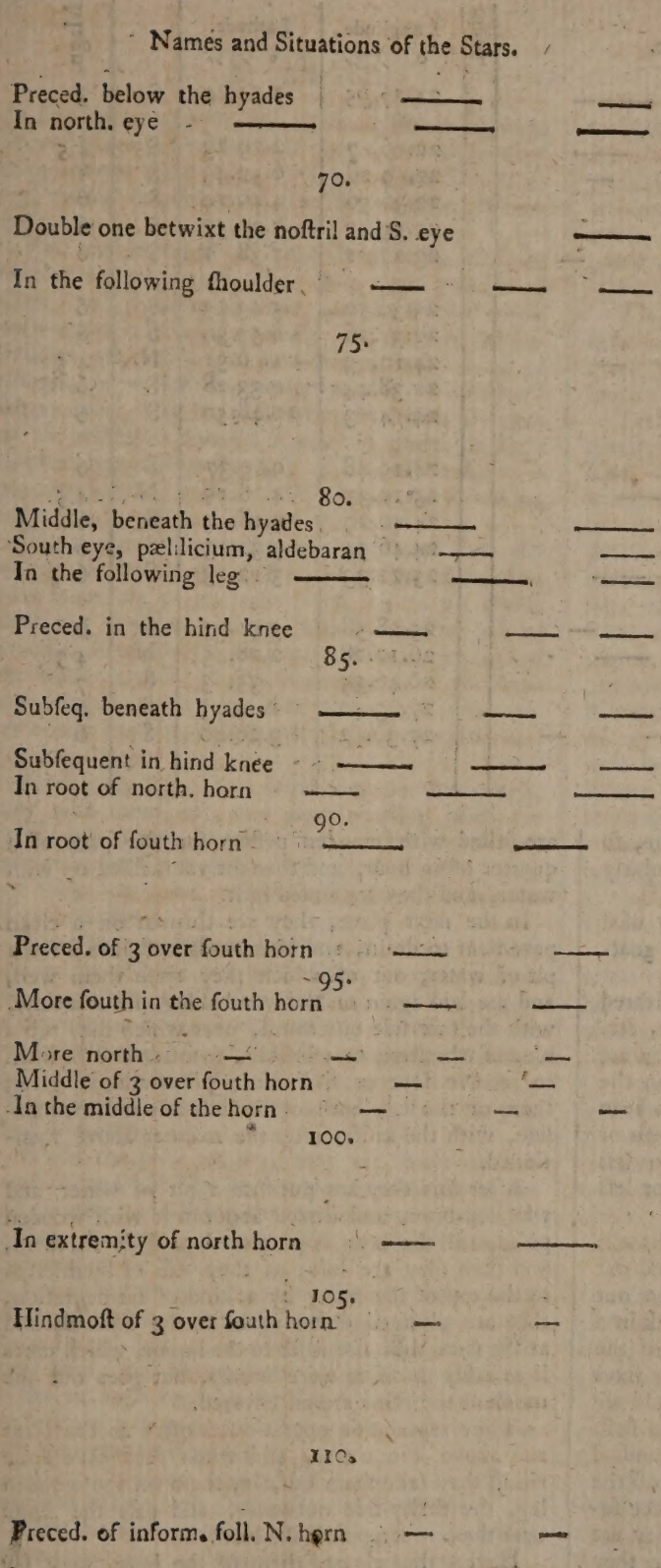
The ſtars in the conſtellation Taurus, in Ptolemy's catalogue, are forty-four; in Tycho's, forty-one; and in the Britannic, a hundred thirty-five. The longitudes, latitudes, magnitudes, &c. are as follow:



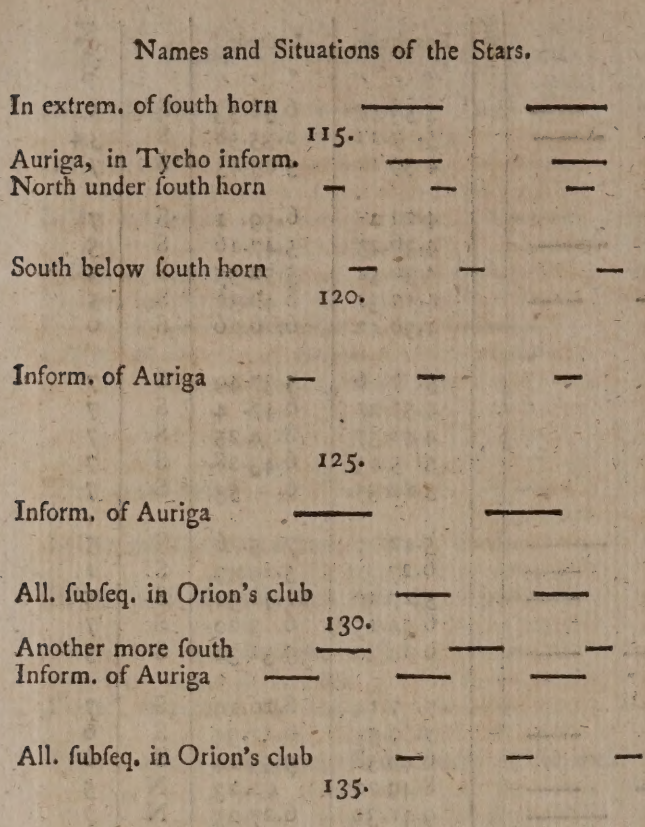
Signs	Longitude. ° ′ ″	Latitude ° ′ ″		Magn.
♉	17.49.36	9.21.47	S	4
	18.33.43	8.49.48	S	4
	19.44.58	7.28.29	S	6
	19.15.18	5.57.13	S	5
	23.47.41	9.30.27	S	6
	24.50. 8	5. 2.24	N	6
	18. 6.10	3.41.37	N	7
	25.38.38	18.27.41	S	4
	20.26.24	5.32.51	S	7
	24. 3. 8	16. 4.57	S	7
	24.30.49	50	S	7
	25.50.24	7.15	S	7
	26.47. 9	3. 3.43	N	7
	26. 7. 5	4.19.25	N	6
	26. 5.21	4. 9. 5	N	5
	26.18.52	4.50.42	N	7
	26.14.42	4.29. 2	N	5
	26.21.31	4.21.25	N	6
	26.25.13	4.31.33	N	7
	26.26.40	4.29.49	N	7

Names and Situations of the Stars.	Signs.	Longitude. ° ′ ″	Latitude. ° ′ ″		Magn.
South of ſquare		26.22.30	3.54 47	N	5
		26.38.32	4. 1.39	NN	7
Lucida Pleidum		26 40. 8	4. 37	NN	3
		26.56.	3.41.45	NN	7
In the eaſt angle		27. 1.52	3.52.37	N	5
25.					
A leſs, contiguous to it		27. 3.19	3.57.34	N	6
Preced. in the foot		22.13. 6	13.30. 6	S	6
Subſeq. in preced. ſhoulder		24. 15	8.40.36	S	5
Subſeq. in foot		23.54.17	13.22.57	S	6
		28.25.21	1.58.32	N	7
30.					
		28.36.33	2.38.20	N	7
		29. 57	10.38	S	7
That in the breaſt		27.17.31	7 59 37	S	4
	♊	26.17	3.13.26	N	7
In the middle of the neck		7.19	1.13.20	N	5
35.					
In the heel of the preced. foot	♉	26.35. 8	14.29.50	S	4
		26.37.57	15. 4. 2	S	7
Preced. the ſquare of the neck	♊	1.36. 9	6.33. 6	N	6
North of ſquare of the neck		1.57.25	7.54.38	N	5
Preced. of two at the knee		40.52	1.24. 6	S	6
40.					
Preced. of the middle ones in the ſquare of the neck		2.19.32	5.16.41	N	6
	♉	28.32.58	15.21.10	S	7
		29.32. 5	13.17.55	S	7
		29.55.38	11.47.39	S	7
That preced. firſt of the hyades	♊	1.27.43	5.50.14	S	7
45.					
That in the preceding cheek		14.12	12 13.17	S	4
Subſeq. of two at knee		2 43.42	47.26	S	6
		3. 9.33	8.53	N	7
Subſeq. of mid. ones in the ſquare of neck		4.32.59	5.46.12	N	5
		3.19.18	19 23	S	7
50.					
Firſt of the hyades in noſtrils		2.27.34	5.46 22	S	3
		3.42.21	15.	N	7
That under the firſt of the hyades		2.13.19	7.20.42	S	6 7
		2.33. 1	6.19.57	S	7
South of ſquare of the neck		4.46 56	3.58.41	N	5
55.					
		2.42.49	7.23. 2	S	7
Between the noſtrils and N. eye		3.31.27	4. 34	S	4
		4.53.21	2.37. 6	N	7
Second		3.47.13	4. 9. 4	S	5
North of ſouth in the ear		4 51.53	35.21	N	4
60.					
In the heel of the hind foot		2.24.57	12. 1.21	S	5
South of ſouth in the ear		4 51.37	29.46	N	5
Third and ſmall between noſtrils and ear		4.11.42	3.43.27	S	6
Preceding of north in the ear		5. 9.42	1. 4. 6	N	5
		3.54. 1	5.41.50	S	7
65.					
		4. 2.12	6. 2.44	S	7
Subſequent		5.25.18	1.12.36	N	6

TAU



Signs.	Longitude.	Latitude.		Magn.
	° ′ ″	° ′ ″		
	3 56.57	6.56.53	S	5
	5. 7.11	2.35.58	S	34
	4 39.12	5 23.43	S	7
	4.22 25	6.59. 1	S	7
	4.36.25	5.47.16	S	5
	4 36.51	5.52.55	S	5
	4.12.31	8.40.32	S	5
	4.56.42	6. 6.26	S	6
	5. 7. 6	5.37.49	S	7
	4 57 22	6.42. 4	S	7
	4 44.57	8. 4.25	S	7
	5. 5 43	6.43.28	S	7
	5.22.35	6. 53	S	7
	5.42. 7	7. 5. 6	S	5
	6.27	5.29.49	S	1
	5.27.10	11.46.51	S	5
	6 54.15	6. 3.20	S	7
	6 24.30	9.32.32	S	5
	7. 7.14	6.19.19	S	7
	7. 9.52	6.12.35	S	6
	6 49 58	9 55.14	S	6
	8 49.20	40.23	N	5
	9.41.32	6.27.25	N	7
	10.24.58	3.40.35	S	6
	12 40.58	2 19. 3	N	6
	11 42. 9	6.18.31	S	7
	12. 6.31	6.38.25	S	7
	13.27.36	1.14.34	S	4
	14. 9 18	4.16. 8	S	6
	14.27. 4	2.30.59	S	6
	14.38.52	3. 5.34	S	6
	16.22.54	48.	S	6
	17.14 58	1. 3. 3	S	6
	18.37.31	5 42.51	N	7
	17.54. 6	6.30.25	S	7
	18. 4.29	5.50.14	S	6
	19.13.26	5.21.34	N	2
	18.29.44	6.33. 2	S	6
	19.10. 6	1.20.12	S	5
	18.49 31	5.18. 4	S	7
	18.59.37	6.1. 45	S	7
	19 42.56	1.51.14	N	7
	20. 3.45	4.43.55	S	6
	20.22.21	4.48.10	S	7
	20.15.54	9. 2 19	S	7
	21. 3.55	40.32	N	6
	21. 8.47	6.20.26	S	7



Signs.	Longitude ° ′ ″	Latitude. ° ′ ″		Magn.
	21.27.55	2.14.24	S	3
	22. 6. 7	2.29.23	S	4 5
	22. 9.28	6.52.43	S	6
	22.36.56	4.26.14	S	6
	22.59.23	7.20.57	S	6
	23.27. 1	7.38. 1	S	6
	23.39.50	5.43.23	S	6
	23.32.16	8.57.39	S	6
	24.10. 3	1. 6.31	N	4 5
	22.38.44	9.33.28	S	6
	24. 4. 3	10.48.50	S	6
	24.19.48	9. 9.37	S	6
	25.10.37	4. 8.15	N	4 5
	24.46.29	9.18. 2	S	6
	24.46.54	9.31.13	S	6
	25.22.33	3.12. 3	S	6
	25.28.58	3.44. 3	S	6
	26.12.28	2.28. 5	N	4 5
	26.46.35	35. 3	S	7
	27. 3.40	1. 4.43	S	6
♊	27.36. 2	3.20.40	S	6

TAWING, the art of dreſſing ſkins in white, ſo as to be fit for divers manufactures, particularly gloves, &.

All ſkins may be tawed; but thoſe chiefly uſed for this purpoſe are lambs, ſheep, kids, and goat-ſkins.

The method of tawing is this: having cleared the ſkins of wool or hair, by means of lime, &c. as deſcribed under the article SHAMMY, they are laid in a large vat of wood or ſtone, ſet on the ground full of water, in which quick-lime has been ſlaked, wherein they are allowed to lie a month or ſix weeks, according as the weather is more or leſs hot, or as the ſkins are required to be more or leſs ſoft and pliant.

While they are in the vat, the water and lime is changed twice, and the ſkins are taken out and put in again every day; and when they are taken out for the laſt time, they are laid all night to ſoak in a running water, to get out the greateſt part of the lime; and in the morning are laid together by ſixes one upon another, upon the wooden leg and are ſcraped ſtoutly one after another, to get the fleſh off from the fleſhy ſide, with a cutting two handled inſtrument called a knife, and then they cut off the legs (if they are not cut off before) and other ſuperfluous parts about the extremes. Then they are laid in a vat or pit with a little water, where they are fulled with wooden peſtles for the ſpace of a quarter of an hour, and then the vat is filled up with water, and they are rinſed in it.

In the next place, they are thrown on a clean pavement to drain, and afterwards caſt into a freſh pit of water, out of which they rinſe them well, and are laid again on the wooden leg, ſix at a time, with the hair-ſide outermoſt, over which they rub a kind of whetſtone very briſkly, to ſoften and fit them to receive four or five more preparations, given them on the leg, both on the fleſh-ſide and the hair-ſide, with the knife, after the manner above mentioned.

After this they are put into a pit of water and wheaten-bran, and ſtirred about in it with wooden poles, till the bran is perceived to ſtick to them, and then they are left; as they riſe of themſelves to the top of the water by a kind of fermentation, they are plunged down again to the bottom, and at the ſame time fire is ſet to the liquor, which takes it as eaſily as if it were brandy, but goes out the moment the ſkins are all covered.

They repeat this operation as often as the ſkins riſe above the water; and when they have done riſing they take them out, lay them on the wooden leg, the fleſhy-ſide outwards, and paſs the knife over them to ſcrape off the bran.

Having thus cleared them of the bran, they lay the

the ſkins in a large baſket, and load them with huge ſtones to promote their draining: and when they have drained ſufficiently, they give them their feeding, which is performed after the manner following:

For one hundred of large ſheep-ſkins, and for ſmaller in proportion, they take eight pounds of alum, and three of ſea-ſalt, and melt the whole with water in a veſſel over the fire, pouring the diſſolution out, while yet luke-warm, into a kind of trough, in which is twenty pounds of the fineſt wheat flour, with the yolks of eight dozen of eggs; of all which is formed a kind of paſte, a little thicker than children's pap; which, when done, is put into another veſſel, to be uſed in the following manner:

They pour a quantity of hot water into the trough in which the paſte was prepared, mixing two ſpoonfuls of the paſte with it; to do which they uſe a wooden ſpoon, which contains juſt as much as is required for a dozen of ſkins: and when the whole is well diluted, two dozen of the ſkins are plunged into it; but they take care that the water be not too hot, which would ſpoil the paſte and burn the ſkins.

After they have lain ſome time in the trough, they take them out, one after another, with the hand, and ſtretch them out; this they do twice; and after they have given them all their paſte, they put them into tubs, and there full them afreſh with wooden peſtles.

Then they put them into a vat, where they are ſuffered to lie for five or ſix days, or more; then they take them out in fair weather, and hang them to dry on cords or racks, and the quicker they are dried the better; for if they be too long a drying, the ſalt and alum within them are apt to make them riſe in a grain, which is an eſſential fault in this kind of dreſſing.

When the ſkins are dry, they are made up into bundles, and juſt dipt in fair water, and taken out and drained; and being thrown into an empty tub, and after having lain ſome time, are taken out and trampled under foot.

Then they draw them over a flat iron inſtrument, the top of which is round like a battledore, and the bottom fixed into a wooden block, to ſtretch and open them; and having been opened, they are hung in the air upon cords to dry: and being dry, they are opened a ſecond time, by paſſing them again over the ſame inſtrument.

In the laſt place they are laid on a table, pulled out, and laid ſmooth, and are then fit for ſale.

After the ſame manner are dreſſed horſes, cows, calves ſkins, &c. for the ſadlers or harneſs makers; as alſo thoſe of dogs, wolves, bears, &c. except that in theſe they omit uſing the paſte, ſalt and alum water being ſufficient.

TAX, a tribute rated upon every town, which formerly was wont to be paid annually into the King's-Exchequer, but now not without conſent of parliament; it differs from a ſubſidy in this, that it is always certain, as ſet down in the exchequer-book, and in general levied of every town, and not particularly of every man, &c. See the article TRIBUTE.

TAXIS, a term uſed by Vitruvius for what is now called ordonnance, being that which gives every part of a building its juſt dimenſions with reſpect to its uſes. See ORDONNANCE.

TAXUS, the yew-tree, in botany, an evergreen, which grows naturally in divers parts of England, and ſeveral other European countries: the wood is hard, reddiſh, veined, and very durable: the branches are ſpreading, and cloſely furniſhed with narrow, ſtiff, blunt-pointed leaves, of a very dark green colour: the flowers come out from the ſides of the branches in cluſters, and are male on ſome trees and female on others, neither have any cup or corolla, but conſiſt of a gem, like a tetraphyllous perianthium: the ſtamina, in the male flowers, conſiſt of a great number of filaments, joined at their bottoms in a column, and terminated with depreſſed antheræ: the piſtillum of the female flower conſiſts of an oval pointed germen, with a blunt ſtigma; and the fruit, when ripe, is of a red colour, ſoft, ſucculent, and open at the top, containing an oval oblong ſeed: the flowers come out at the latter end of May, and the berries are ripe in autumn.

The yew-tree is propagated by ſowing its ſeeds when ripe: it is not ſo much raiſed now as formerly, when it was more in eſteem; but as the faſhion of clipped evergreens are now in diſrepute, the principal uſe of theſe trees, at preſent, is to form hedges for the defence of tender plants, for which purpoſe it is the moſt proper of any: it is naturally of ſlow growth, and if planted among other evergreens, makes, with its dark green leaves, a fine contraſt with thoſe of a lighter colour. The ſeaſons for removing theſe trees are either autumn or ſpring, according to the dryneſs or moiſture of the ſoil.

This tree has great plenty of fibrous roots; therefore, by digging round them every year, and tranſplanting every third, will render them capable of being removed with the greater certainty of their growing, when they are got conſiderably large. There are many large yew-trees growing in ſeveral parts of England, the timber of which is greatly eſteemed for many purpoſes.

TEA, *Thea*, in botany, a genus of plants, whoſe flower conſiſts of ſix large, roundiſh, concave, equal petals, with a number of thread-like ſtamina; the fruit is a capſule formed of three globular bodies growing together, it contains three cells, each of which incloſes a globoſe ſeed, internally angulated.

The tea plant is a ſhrub which grows to five or

 ſix

ſix feet high, and is very ramoſe; its root is ſpreading and fibrous; the leaves are about an inch long and near half an inch broad, ſerrated on their edges, and terminating in a point. It is a native of China and Japan.

The dried leaves of this plant make a very conſiderable article of commerce; their taſte is bitteriſh in a ſmall degree, and ſlightly aſtringent; the ſmell is very agreeable, and by ſome is compared to that of new hay, or violets.

Tea is imported by variety of names, but it may principally be divided into three kinds, namely, the green, the imperial, and the bohea. The green is of ſeveral ſorts, and is of various degrees of goodneſs, from the common coarſe green tea to the hyſon, which is now the deareſt and accounted the beſt of all. The imperial tea is ſo called, becauſe it is chiefly uſed by the emperor and great men in China and Japan: the leaf is large, and not ſo much rolled up as in the other kinds; the colour is greeniſh, lively, and of a fine ſmell, with an agreeable taſte. This, not many years ago, was in great requeſt with us, but now we either have it not at all, or it is ſold under a different name. The bohea is of a reddiſh brown, and the leaf is ſmall, rolled up, and tinges the water of a browniſh colour; but as the difference of taſte of theſe teas are ſo well known, they therefore need not be inſiſted on.

Some authors aſſure us, there is no difference between the green and bohea teas but what ariſes from the manner of curing them; for the bohea is ſaid to be higher dried, or rather burned, from which it receives its different taſte and colour: they are all, however, the leaves of the ſame tree, and, perhaps, only differing according to the ſeaſons when they are gathered.

The leaves being gathered, they are dried with great caution, partly by the help of air, and partly by heat; and, when thoroughly dried, will keep a long time freſh and good.

The common people of China put the tea into a veſſel full of water, and boil it over a ſlow fire, where they keep it the whole day, and it ſerves for common drink.

The Japaneſe grind their tea to powder, and then put a ſpoonful of it into one of their cups, pouring hot water thereon, and then beating them up together with a bruſh till a foam ariſes thereon.

The Chineſe pretend it is endowed with extraordinary virtues; ſuch as cleanſing the blood, curing the virtigo, eaſing pains in the head, and helping the dropſy; however, it is certainly of ſome uſe in abating the acrimony of the humours, and in keeping people awake; but more eſpecially in thoſe who drink it but ſeldom.

Some phyſicians pretend that the Japaneſe, who drink it conſtantly, are never troubled with the ſtone or gravel; but we find no ſuch effects in theſe parts. It is gently aſtringent, for which reaſon it hinders the water from weakening the ſtomach; and in thoſe who take it but ſeldom, it will prevent the operation of a purge: it has indeed ſome power in preventing the gravel, but then it does not ariſe from the tea, for hot water alone will do the ſame. In general, it may be obſerved, that tea has contrary effects on different people; and, therefore, though it may be good for ſome conſtitutions, it is hurtful to others; for the good qualities of tea do not prevent its often doing harm: even in China, where its virtues are ſo vaſtly extolled, the people who drink it to great exceſs, are often thrown into diabetes, and die emaciated by it.

TEARS, *Lachryma*, a lymph or aqueous humour, which is ſubtile, limpid, and a little ſaltiſh: it is ſeparated from the arterial blood by the lachrymal glands, and ſmall glandulous grains on the inſide of the eye-lids.

This fluid ſerves to moiſten and deterge the eyes and the eye-lids, after which it tends to the internal angle of the eye, and is abſorbed by the puncta lachrymalia, and conveyed to the lachrymal bag, from whence it goes into the noſe, by the naſal canal. See the article LACHRYMALIA.

TEASEL, or TEAZEL, in botany. See the article DIPSACUS.

TEBETH, the tenth month of the Jewiſh eccleſiaſtical year, and fourth of the civil; anſwering to our month of December.

TECHNICAL, ſomewhat relating to arts or ſciences; in this ſenſe we ſay, technical terms, &c.

It is alſo particularly applied to a kind of verſes, wherein are contained the rules or precepts of any art, thus digeſted to help the memory to retain them. See the article MEMORY.

TE DEUM, the name of a celebrated hymn, uſed in the Chriſtian church, and ſo called becauſe it begins with theſe words, *Te Deum laudamus*; We praiſe thee, O God.

It is ſung in the Romiſh church with great pomp and ſolemnity, upon the gaining of a victory, or other happy event.

TEETH. See the article TOOTH.

TELEPHIASTRUM, in botany, a name by which Dillenius calls a ſpecies of portulaca. See the article PORTULACA.

TELEPHIUM, orpine, in botany, a genus of plants, whoſe flower conſiſts of five oblong, obtuſe, erect petals, which are narroweſt at their baſe: the ſtamina are five ſubulated filaments, terminated with incumbent antheræ: the germen is three-cornered, acute, and crowned with three pointed ſpreading ſtigmas: the fruit is a ſhort triquetrous capſule, having three valves and one cell, which contains many roundiſh ſeeds. See the article ORPINE.

TELEPHOIDES, in botany, Tournefort's name for a ſpecies of andrachne. See the article ANDRACHNE.

TELESCOPE, an optical inſtrument conſiſting of

of ſeveral lenſes, by means of which, remote objects are ſo magnified as to appear nigh at hand. See LENS.

That the teleſcope is of a modern invention is moſt certain; neither does it appear that microſcopes, or optic glaſſes of any kind, were known to the antients. It is contended that Alexander de Spina, a native of Piſa, was the firſt that made the uſe of glaſſes known to the world; but our countryman, friar Bacon, who died twenty one years before him, was, in all probability, acquainted with them firſt; for he wrote a book of perſpective, in which he plainly ſhews that he did not only underſtand the nature of convex and concave glaſſes, but the uſe of them when combined in teleſcopes; though he no where in that treatiſe, diſcovers the manner in which they are to be put together. The teleſcope, with the concave eye-glaſs, was firſt invented by a mechanic of Middleburgh in Zealand, called Z. Johannides, about the year 1590, though J. Lipperhoy, another Dutchman, is candidate for the ſame diſcovery. From whence this ſort of teleſcope is called tubus batavus.

Franciſcus Fontana, a Neapolitan, contends, that he was the firſt contriver of the teleſcope compoſed of two convex glaſſes, which is now the common aſtronomical teleſcope; and Rheita pretends to be the firſt that rendered that teleſcope fit for terreſtrial uſes, by adding two eye-glaſſes to it.

The teleſcope is of two ſorts, viz. dioptric or refracting; or cata-dioptric, by reflection and refraction conjointly.

Dioptric or refracting TELESCOPE conſiſts of an object glaſs *xz* (plate LXXXVI. fig. 1.) by which the image *fd* of an object OB, at a diſtance, is formed in the focus *e* of the ſaid glaſs, and in an inverted poſition. This image may be viewed by a ſingle lens, *ab*, placed at its focal diſtance, as is uſually done for viewing the heavenly bodies, becauſe in them we do not regard the poſition: but for viewing objects near us, whoſe image we would have erect, we muſt for that purpoſe, add a ſecond lens *pq*, at double its focal diſtance from the other, that the rays which come from *ab* may croſs each other in the focus *o*, in order to erect the image *gn*, which it will form in its own focus *m*, becauſe the rays come parallel from the lens *ab*. Laſtly, a third lens *ic* is added to view the ſecondary image *gn*, Theſe three lenſes, or eye-glaſſes, are uſually of the ſame ſize and focal length; and the power of magnifying is always as the focal length of the object-glaſs *ew* divided by the focal length of the eye glaſs *lm* or *he*: for inſtance, ſuppoſe *ew* = 10 feet or 120 inches, and *he* or *lm* = 3 inches; then will the object appear to the eye, through ſuch a teleſcope, 40 times bigger than to the naked eye: and its ſurface will be magnified 1600 times, and its bulk or ſolidity 64000 times.

If inſtead of a convex eye-glaſs we ſhould uſe a concave one of the ſame focal length, it would repreſent the object erect, equally magnified, and more diſtinct and bright; but the diſadvantage of this glaſs is, that it admits but of a ſmall area, or field of view, and, therefore, not to be uſed when we would ſee much of an object, or take in a great ſcope; but it is uſed to great advantage in viewing the planets and their ſatellites, Saturn's ring, Jupiter's belts, &c.

The magnifying power of a refracting teleſcope is thus eſtimated: let AB (fig. 2.) be the object-glaſs, and CD the eye-glaſs; and let HFI and GFM be two rays coming from the extreme parts of a diſtant object, and croſſing each other in the center F of the glaſs AB. Then is the angle GFH = IFM that under which the object appears to the naked eye; but IEM = CKD is that under which the image appears as magnified by the eye-glaſs CD. But the angle IEM is to the angle IFM, as LF to LE, or as the focal diſtance of the object-glaſs to the focal diſtance of the eye-glaſs; and in that proportion is the object magnified.

There is a defect in all teleſcopes of this kind, not to be remedied by any means whatever, which was thought only to ariſe from hence, that ſpherical glaſſes do not collect rays to one and the ſame point; but it was happily diſcovered by Sir Iſaac Newton, that the imperfection of this ſort of teleſcope, ſo far as it ariſes from the ſpherical form of the glaſſes, bears almoſt no proportion to that which is owing to the different refrangibility of light. This diverſity in refraction of the rays is about a twenty-eight part of the whole, ſo that the object glaſs of a teleſcope cannot collect the rays, which flow from any one point in the object, into a leſs room than the circular ſpace whoſe diameter is about the fifty-ſixth part of the breadth of the glaſs. Therefore ſince each point of the object will be repreſented in ſo large a ſpace, and the centers of thoſe ſpaces will be contiguous, becauſe the points in the objects the rays flow from are ſo, it is evident that the image of an object made ſuch by a glaſs muſt be a moſt confuſed repreſentation, though it does not appear ſo when viewed through an eye-glaſs that magnifies in a moderate degree; conſequently, the degree of magnifying in an eye-glaſs muſt not be too great with reſpect to that of the object-glaſs, leſt the confuſion become ſenſible. Notwithſtanding, however, this imperfection, a dioptrical teleſcope may be made to magnify in any given degree, provided it be of ſufficient length; for, the greater the focal diſtance of the object-glaſs is, the leſs may be the proportion which the focal diſtance of the eye-glaſs may bear to that of the object glaſs, without rendering the image obſcure. Thus an object glaſs, whoſe focal diſtance is about four feet, will admit of an eye-glaſs whoſe focal diſtance ſhall be little

more than one inch, and, consequently, will magnify almost forty-eight times: but an object-glass of forty feet focus, will admit of an eye-glass of only four inch focus, and will therefore magnify 120 times; and an object glass of an hundred feet focus, will admit of an eye-glass of little more than six inch focus, and will therefore magnify almost 200 times.

The reason of this disproportion, in their several degrees of magnifying, is to be explained in the following manner: since the diameters of the spaces, into which rays flowing from the several points of an object are collected, are as the breadth of the object-glass, it is evident that the degree of confusedness in the image is as the breadth of the glass (for the degree of confusedness will only be as the diameters or breadths of those spaces, and not as the spaces themselves.) Now the focal length of the eye-glass, that is, its power of magnifying, must be as that degree; for, if it exceeds it, it will render the confusedness sensible; and therefore must be as the breadth or diameter of the object-glass. The diameter of the object-glass, which is as the square square root of its apurture or magnitude, must be as the square root of the power of magnifying in the telescope; for, unless the apurture itself be as the power of magnifying, the image will want light: the square root of the power of magnifying, will be as the square root of the focal distance of the object-glass; and therefore the focal distance of the eye-glass must be only as the square root of the object-glass. So that in making use of an object-glass of a longer focus, suppose than one that is given, you are not obliged to apply an eye-glass of a proportionably longer focus than what would suit the given object-glass, but such a one only whose focal distance shall be to the focal distance of that which will suit the given object-glass, as the square root of the focal length of the given one. And this is the reason that longer telescopes are capable of magnifying in a greater degree than shorter ones, without rendering the object confused or coloured.

Cata-dioptric, or *reflecting* TELESCOPE, is the most noble and useful of all others; the mechanism of which is as follows:

ABEH (fig. 3.) is the large tube, or body of the instrument, in which BE is a large reflecting mirrour, with a hole in the middle CD. This mirrour receives the rays *a c*, *b d*, coming from the object at a distance, and reflects them converging to its focus *e*, where they cross each other, and form the inverted image IM; *xy* is a small concave mirrour, whose focus is at *f*, at a small distance from the image. By this means the rays coming from the image are reflected back through the central hole CD of the large mirrour, where they fall on the plano convex lens WX, and are by it converged to a focus, and there form a second image RS, very large and erect, which is viewed by a meniscus eye-glass YZ, by the eye at P, through a very small, hole in the end of the eye-piece YCDZ.

If the first lens WX were taken away, the image would be formed somewhat larger at *MI*; but the area or scope would be less, and therefore the view not so pleasant. At TV is placed a circular piece of brass, with a hole of a proper size to circumscribe the image, and cut off all superfluous or extraneous rays, that so the object may appear as distinct as possible.

As the image is formed by reflection, the rays of every sort will be united nearly in one point, and will therefore admit of an eye-glass YZ of a deep charge, or small focal distance; and so the power of magnifying will be proportionally increased.

The magnifying power of a reflecting telescope is thus computed. The parallel rays KB (fig. 4.) and LE are reflected by the large object speculum AF to its focus *a*, where the image IM is formed; which image is defined by two other rays NQ, PQ, coming from the extreme parts of the object at a remote distance, and meeting in the center of the large speculum at Q. Now if *f* be the focus of the small mirrour GH, supposing the image were formed in the said focus *f* (that is, that both the foci *a* and *f* were coincident) then the rays proceeding from the image IM will proceed parrallel after reflection, and produce distinct vision of the image, which will then subtend an angle IOM at the center O of the speculum GH, which is to the angle IQM, under which the object appears to the naked eye, as *a* Q to *a* O or *f* O. So that the magnifying power would in this case be as $\frac{a\,Q}{f\,O}$.

But, to increase this magnifying power, the image IM is not placed in the focus of the small speculum, but at a small distance beyond it; by which means the rays coming from the image to the speculum GH will be reflected converging to a distant focus R, where a secondary large image *IM* is formed from the first image IM; which image is seen under the same angle *IOM* with the former from the center of the speculum GH: but from the center of the eye-glass TV it is seen under the large angle *ISM*. But the angle *ISM* is to the angle *IOM* as OR to SR; wherefore the second ratio, or part of the magnifying power, is that of $\frac{O\,R}{S\,R}$.

Consequently the whole magnifying power of the telescope is $\frac{a\,Q}{a\,O} \times \frac{O\,R}{S\,R}$ (because in this case *f* O becomes *a* O.) Or, in other words, the angle NQP. under which the object appears to the naked eye, is to the angle *ISM*, under which the large magnified secondary image *IM* appears to the eye through the eye-glass, as $\frac{a\,Q \times O\,R}{a\,O \times S\,R}$. Such is the theory of the

telescope

teleſcope firſt contrived by Dr. J. Gregory, and therefore called the Gregorian teleſcope; but it received its laſt improvement from the late Mr. Halley, and is now in common uſe.

A ſmall alteration was made in the ſtructure of this teleſcope by Mr. Caſſegrain, viz. in uſing a convex ſpeculum *GH* (fig. 4.) inſtead of the concave one GH. Now, if they are equally ſpherical, that is, if they are ſegments of the ſame ſphere, then will *f* be alſo the vertual focus of the convex GH; and, if all other things remain the ſame, the firſt image IM will be virtually the ſame as before, and the laſt image *IM* will be really the ſame; ſo that the magnifying power of this form of the teleſcope is $\frac{aQ \times OR}{aO \times SR}$, which is equal to that of Gregory's form.

Sir Iſaac Newton ordered this teleſcope to be made in a different form or manner, as follows: ABCD (fig. 5.) was a large octagonal tube, or caſe; EF a large poliſhed ſpeculum, whoſe focus is at *o*; GH a plane ſpeculum truly concentered, and fixed at half a right-angle with the axis of the large one. Then parallel rays *a*E, *b*F, incident on the large ſpeculum EF, inſtead of being reflected to the focus *o*, were intercepted by the ſmall plane ſpeculum GH, and by it reflected towards a hole *cd* in the ſide of the tube, croſſing each other in the point O, which is now the true focal point; and from thence they proceed to an eye-glaſs *ef* placed in that hole, whoſe focal diſtance is very ſmall, and therefore the power of magnifying may be very great in this form of the teleſcope; becauſe the image IM is made by one reflection (for that of the plane ſpeculum only alters the courſe of the rays, and adds nothing to the confuſion of the image) and will, for that reaſon, bear being viewed by a glaſs of a very deep charge, in compariſon of an image formed by differently refrangible rays.

This teleſcope is a very good one, as to its effect or performance, but it is not ſo commodious for common uſe as thoſe of the Gregorian form, and is therefore now pretty much laid aſide. They who would ſee a larger account hereof may conſult Sir Iſaac's Optics, and ſeveral Philoſophical Tranſactions, where he deſcribes it at large, and the reaſons which induced him to make choice of this ſtructure rather than that of Dr. Gregory: or ſee a compendious account of the whole in the laſt edition of Dr. Gregory's Elements of Optics.

Aerial TELESCOPE, is a dioptric teleſcope uſed without a tube, in a dark night; for the uſe of the tube is not only to direct the glaſſes, but alſo to make the place dark where the images of objects are formed.

Huygenius contrived a teleſcope of this kind for viewing the celeſtial bodies, by fixing the object-glaſs on the top of a long upright pole, and directing its axis towards any object by means of a ſilk line coming from the object-glaſs to the eye-glaſs below.

TELLER, an officer of the Exchequer, in ancient records called tallier; there are four of theſe officers, whoſe duty is to receive all ſums due to the king, and to give the clerk of the pells a bill to charge him therewith.

They likewiſe pay all money due from the king, by warrant from the auditor of the receipt, and make weekly and yearly books, both of their receipts and payments, which they deliver to the lord-treaſurer.

TEMPERAMENT, among phyſicians, denotes the ſame with conſtitution; or a certain habitude of the humours of the human body, whereby it may be denominated hot, cold, moiſt, dry, bilious, ſanguine, phlegmatic, melancholic, &c.

According to Boerhaave, moiſtening, diluting, and temperating ſubſtances, are a proper diet for perſons of a hot and acrid temperament; and, on the contrary, all heating things are prejudicial to them: whereas, in perſons of a cold and moiſt habit, juſt the reverſe of this obtains. To perſons of a ſanguineous temperament, evacuating and temperating medicines are beneficial, and heating or draſtic ſtimulating things pernicious. Perſons of a melancholy temperament, are greatly injured by hot, drying, and acrid ſubſtances; whereas moiſtening, refrigerating, relaxing, emollient ſubſtances, and ſuch as gently diſſolve without acrimony, are beneficial to them. See CONSTITUTION.

TEMPERAMENT, in muſic, is the rectifying or mending the imperfect concords, by transferring to them part of the beauties of the perfect ones. See CONCORD and INTERVAL.

TEMPERING *of Steel and Iron*, the rendering them either more compact and hard, or ſoft and pliant, according as the different uſes for which they are wanted may require.

To harden and temper Engliſh, Flemiſh, and Swediſh ſteel, they muſt have a pretty high heat given them, and then be ſuddenly quenched in water to make them hard; but Spaniſh and Venetian ſteel will require no more than a blood-red heat before it is quenched.

If the ſteel be too hard or brittle for an edged tool, &c. take it down by rubbing a piece of grind-ſtone or whet-ſtone hard upon the work, to take off the black ſcurf; then brighten or heat it in the fire, and as it grows hotter, you will ſee the colour change by degrees, coming firſt to a ſtraw or light gold-colour, then to a darker gold-colour, and at laſt to a blue-colour.

Chooſe ſuch of theſe colours as the work requires, then quench it ſuddenly in the water. The light gold-colour is for files, cold chiſſels, and punches to punch iron and ſteel: the dark gold-colour, for punches to uſe on braſs, &c. and the blue-colour gives

gives the temper for ſprings. The tempering of files and needles is performed after a peculiar manner. See the article STEEL.

TEMPLARS, or TEMPLERS, a religious order inſtituted at Jeruſalem, about the year 1118.

Some religious gentlemen put themſelves under the government of the patriarch of Jeruſalem, renounced property, made the vow of celebacy and obedience, and lived like canons regular. King Baldwin aſſigned them an apartment in his palace. They had likewiſe lands given them by the king, the patriarch, and the nobility, for their maintenance.

At firſt there were but nine of this order, and the two principal perſons were Hugo de Paganis, and Geoffroy of St. Omers. About nine years after their inſtitution, a rule was drawn up for them, and a white habit aſſigned them, by pope Honorius II. About twenty years afterwards, in the popedom of Eugenius III. they had red croſſes ſewed upon their cloaks, as a mark of diſtinction; and in a ſhort time they were increaſed to about three hundred, in their convent at Jeruſalem.

They took the name of Knights Templars, becauſe their firſt houſe ſtood near the temple dedicated to our Saviour, at Jeruſalem.

This order, after having performed many great exploits againſt the infidels, became rich and powerful all over Europe; but the knights, abuſing their wealth and credit, fell into great diſorders and irregularities. Many crimes and enormities being alledged againſt them, they were proſecuted in France, Italy, and Spain; and at laſt, the pope, by his bull of the 22d of May, 1312, given in the council of Vienna, pronounced the extinction of the order of Templars, and united their eſtates to the order of St. John of Jeruſalem.

TEMPLE, a general name for places of public worſhip, whether Pagan, Chriſtian, or otherwiſe.

But the word, in a reſtrained ſenſe, is uſed to denote the places, or edifices, in which the pagans offered ſacrifice to their falſe gods. Thus we hear of the Temples of Jupiter, Apollo, Bacchus, &c.

TEMPLES, in anatomy, a double part of the head, reaching from the forehead and eyes to the two ears.

TEMPORAL, a term generally uſed for ſecular, as a diſtinction from eccleſiaſtical. Thus we ſay, temporal lords, and ſpiritual or eccleſiaſtical lords.

TEMPORALITIES, the temporal revenues of an eccleſiaſtic, ſuch as have been annexed to biſhops ſees by kings and other great perſonages of this land, as they are barons or lords of parliament, ſuch as manors, lands, and lay-fees.

TENAILLE, in fortification, a kind of outwork, reſembling a horn-work, but generally ſomewhat different, for inſtead of two demi-baſtions, it bears only in front a re-entering angle betwixt the ſame wings without flanks; and the ſides are parallel. See the articles FORTIFICATION and HORN-WORK.

TENANT, one that holds lands or tenements of ſome lord, or land, by rent, fealty, &c.

TENCH, in ichthyology, the Engliſh name of a ſpecies of the cyprinus, of a purpliſh black colour, with an even tail; its length is generally about ten or eleven inches, its breadth about three, and its thickneſs more than two; but it ſometimes grows to an immoderate large ſize.

TENDER, in law, ſignifies carefully to offer, or circumſpectly endeavour the performance of a thing; as, to tender rent, is to offer it at the time and place when and where it ought to be paid, which is done to ſave the penalty of a bond or obligation, before action is brought thereon.

TENDER, a ſmall ſhip, in the ſervice of men of war, for carrying of men, proviſions, or any thing elſe that is neceſſary.

TENDONS, are white, firm, and tenacious parts, continuous to the muſcles, and uſually forming their extremities. When the fibres, of which they are compoſed, expand themſelves into a membrane, they are called Aponeuroſes. See the article MUSCLE.

TENEMENT, properly ſignifies a houſe; but in a larger ſenſe, it is taken for any houſe, land, rent, or other thing, which a perſon holds of another.

TENESMUS, in medicine, a name given by medical writers, to a complaint which is a continual deſire of going to ſtool, but without any ſtool being ready to be voided.

Signs of it are a titillation and itching about the anus, attended with a violent burning pain, and a deſire of compreſſing and voiding ſomething, and this attended uſually with no excrement, or only a pulpous or mucous matter, and very often a falling down of the rectum.

The cauſes of a teneſmus are, the aſcarides, a ſmall ſort of worms, which uſually infeſt the rectum, and occaſion a continual itching and tickling there; the abuſe of reſinous purging medicines; much riding will alſo ſometimes occaſion it. See PROLAPSUS, HÆMORRHOID, &c.

As the teneſmus is merely a ſymptomatic diſeaſe, the primary diſorder is firſt to be examined, and treated in order to a cure; thus, when it is occaſioned by aſcarides, worm medicines are to be given, and clyſters of a proper kind injected; and when the worms are by this means deſtroyed, the teneſmus, which was no more than a ſymptom, naturally ceaſes. In general, the regimen and method of cure in a teneſmus, are the ſame with thoſe preſcribed in a dyſentery; great relief is afforded by a fomentation of warm milk, in which elder-flowers have been boiled, as alſo by a clyſter of mutton broth,

broth, or an emollient clyſter, in which earth-worms have been boiled. In a teneſmus, the laſt refuge is to opiates. See DYSENTERY.

TENET, or TENENT, a particular opinion, dogma, or doctrine, profeſſed by ſome divine, philoſopher, &c.

TENON, in building, &c. the ſquare end of a piece of wood, or metal, diminiſhed by one-third of its thickneſs, to be received into a hole in another piece, called a mortiſe, for the jointing or faſtening the two together.

It is made in various forms, ſquare, dove-tailed for double mortiſes, and the like.

TENOR, or TENOUR, the purport or content of a writing or inſtrument in law, &c.

TENOR, or TENORE, in muſic, the firſt mean or middle part, or that which is the ordinary pitch of the voice, when neither raiſed to a treble, or lowered to a baſs. See BARITONO.

TENOR, or TENORISTA, is alſo uſed for a perſon who ſings the tenor part in concert alſo, for any inſtrument proper to play it.

TENSE, time, in grammar, an inflection of verbs, whereby they are made to ſignify or diſtinguiſh the circumſtance of time, in what they affirm. See VERB.

There are only three ſimple tenſes, or times; the preſent, as *amo*, *I love*; the preterit, as *amavi*, *I have loved*; and the future, as *amabo*, *I ſhall* or *will love*. See PRESENT, &c.

But, as in the preterit, one may ſay, that the thing is but juſt now done; or, indefinitely, that it was done; hence, in moſt languages, there are two ſorts of preterits, or paſt tenſes; the one definite, which marks the thing to be preciſely done, as *I have ſaid*, *I have done*, *I have dined*; the other ſignifies it done indeterminately, and is for that reaſon called indefinite, or aoriſt, as *I wrote*, *I went*, &c. See the articles AORIST, IMPERFECT, PLUSQUAMPERFECT, &c.

TENT, in ſurgery, a roll of lint worked into the ſhape of a nail, with a broad flat head.

Tents differ in thickneſs and length, according to the ſize of the wound for which they are intended.

TENTER, a machine uſed in the cloth manufacture, to ſtretch out the pieces of cloth, ſtuff, &c. or only to make them even, and ſet them ſquare.

TENURE, in law, ſignifies the manner whereby lands or tenements are held, or the ſervice that the tenant owes to his lord: it likewiſe denotes the eſtate in the land.

TEPID, a term uſed by writers on mineral waters, &c. to expreſs ſuch of them as have a leſs ſenſible cold than common water. See the article MINERAL WATERS.

TEREBINTHUS, the turpentine-tree. See the article TURPENTINE.

TERES, in anatomy, a name given to two muſcles of the arm; one is called teres major, and is one of the depreſſor muſcles, which has its origin at the lower angle of the ſcapula, and its termination three fingers below the head of the humerus: the other is called teres minor, being one of the abductor-muſcles, and having its origin at the inferior coſta of the ſcapula; this, together with the infraſpinatus, properly forms one conjunct muſcle, having at the extremity, only a ſingle tendon, which is inſerted into the poſterior part of the neck of the humerus.

TERGIFŒTUS PLANTS, ſuch as bear their ſeeds on the backſides of their leaves: ſuch are all the capillary plants.

TERM, *Terminus*, in general, ſignifies much the ſame with boundary, or limit.

TERM, in law, is generally taken for a limitation of time or eſtate; as a leaſe for a term of life or years, which is deemed a chattel real. See the article CHATTEL.

Term, however, is more particularly uſed for that time wherein our courts of juſtice are open; in oppoſition to which, the reſt of the year is called vacation.

TERMS *of an Equation*, in algebra, are the ſeveral names or members, of which it is compoſed, and ſuch as have the ſame unknown letter, but in different powers or degrees: for if the ſame unknown letter be found in ſeveral members in the ſame degree or power, they ſhall paſs but for one term.

TERMS *of Proportion*, in mathematics, are ſuch numbers, letters, or quantities, as are compared one with another.

Thus, if $\begin{matrix} 2 \cdot 4 :: 8 : 16 \\ a \cdot b :: c : d, \end{matrix}$ then *a*, *b*, *c*, *d*, or 2, 4, 8, 16, are called the terms; *a* being the firſt term, *b* the ſecond term, &c.

TERMS, or COURSES, in medicine, the menſes, or womens monthly purgations. See the article MENSES.

TERRACE, in gardening, a bank of earth raiſed to a proper elevation, whereby the proſpect of the adjacent country may be more enlarged. When terraces are rightly ſituated, they are great ornaments, for their regularity and opening, eſpecially when they are well made, and their aſcent not too ſteep.

TERRACE is alſo applied to the roofs of houſes that are flat, and whereon one may walk; as alſo to balconies that project.

TERRAQUEOUS, in geography, an appellation given to our globe, becauſe conſiſting of land and water.

TERRE-PLEIN, in fortification, denotes the horizontal ſuperficies, or top, of the rampart, between the inferior talus and the banquette. It is thus called, as lying nearly level, with only a little ſlope inwardly, to bear the recoil of the cannon.

TERRE-TENANT, in law, the perſon who hath

the actual poſſeſſion of the land: thus, if a freeholder lets out his freehold to another, to be poſſeſſed and occupied by him, this perſon is called the terre-tenant.

TERRELLA, *μικρὸν*, an appellation given to a load-ſtone, when turned into a ſpherical figure, and is placed ſo, that its poles and equator, &c. correſpond to the poles and equator of the world; as being a juſt repreſentation of the great magnetical globe which we inhabit. See the article MAGNET.

Such a terrella, if nicely poiſed and placed in a meridian, it was imagined, would turn about its axis once in twenty-four hours; but experience has ſhewed this to be a miſtake.

TERRESTRIAL, ſomething partaking of the nature of earth: thus we ſay, the terreſtrial globe, line, &c.

TERRITORY, in geography, denotes an extent or compaſs of land, within the bounds, or belonging to the juriſdiction, of any ſtate, city, or other ſubdiviſion of a country.

TERTIAN, in medicine, an ague, or intermitting fever, the fits of which return every third day: that is, there are two fits in three days, the day intervening being without any fit at all.

TESSELATED PAVEMENTS, thoſe of rich moſaic work, made of curious ſquare marbles, bricks, or tiles, called teſſelæ, from their reſembling dice.

TEST, in metallurgy, a veſſel of the nature of the coppel, uſed for large quantities of metals at once.

TEST LIQUOR, a liquor uſed by dealers in brandies, to prove whether they be genuine, or mixed with home-ſpirits.

TESTACEOUS, in natural hiſtory, an epithet given to a ſpecies of fiſh, which are covered with a ſtrong thick ſhell, as tortoiſes, oyſters, pearl-fiſh, &c.

TESTAMENT, *Teſtamentum*, in law, a ſolemn and authentic act, whereby a perſon declares his will, as to the diſpoſal of his eſtate, effects, burial, &c. See the article WILL.

There are two ſorts of teſtaments, viz. one in writing, and one in words; which laſt is called a nuncupative teſtament, or will: but this is not good in caſe of lands, which are only deviſeable by a teſtament in writing, executed in the life-time of the teſtator.

TESTATOR, or TESTATRIX, the perſon who makes his or her will and teſtament.

TESTATUM, in law, a writ in perſonal actions, where, if the defendant cannot be arreſted on a capias, in the county where the action is laid, but is returned non eſt inventus by the ſheriff, this writ ſhall be ſent into any other county, where ſuch a perſon is thought to be, or have wherewithal to ſatisfy the demand.

TESTICLE, *Teſtis*, in anatomy, a double part in male animals, ſerving for generation. See the article GENERATION.

TESTICULATED, among botaniſts, an appellation given to roots compoſed of two tuberoſe knobs, reſembling teſticles; ſuch are thoſe of orchis, &c.

TESTIMONIAL, a kind of certificate, ſigned either by the maſter and a fellow of the college where the perſon laſt reſided; or by three, at leaſt, reverend divines, who knew him well for three years laſt paſt, giving an account of the virtues, uniformity, and learning of the perſon.

Teſtimonial is alſo a certificate, under the hand of a juſtice of the peace, teſtifying the place and time when a ſoldier, or mariner landed, and the place of his dwelling, &c. whither he is to paſs.

There is alſo another kind of teſtimonial for the clergy, made by perſons preſent, that a clergyman has in all things complied with the act of uniformity; and to certify, that the clerk has performed what the law requires on his inſtitution and induction.

TESTUDO, in zoology, a genus of amphibious animals, with four legs and a tail, and the body covered with a firm ſhell.

This genus comprehends all thoſe animals known in Engliſh by the names of tortoiſes and turtles; of which there are a great many ſpecies, ſome with four toes on each foot; others with five toes on the fore feet, and four on the hinder ones; and others, diſtinguiſhed by other peculiarities, particularly the compartments of their ſhells, ſome being divided into irregular ſpaces, and others beautifully teſſelated. See plate LXXXV. fig. 4.

The Americans find ſo good account in catching turtle, that they make themſelves very expert at it: they watch them from their neſts on ſhore, in moonlight lights; and, before they reach the ſea, turn them on their backs, and leave them till morning; when they are ſure to find them, ſince they are utterly unable to recover their former poſture: at other times they hunt them in boats, with a peculiar kind of ſpear, ſtriking them with it through the ſhell; and as there is a cord faſtened to the ſpear, they are taken much in the ſame manner as the whales. See the article FISHERY.

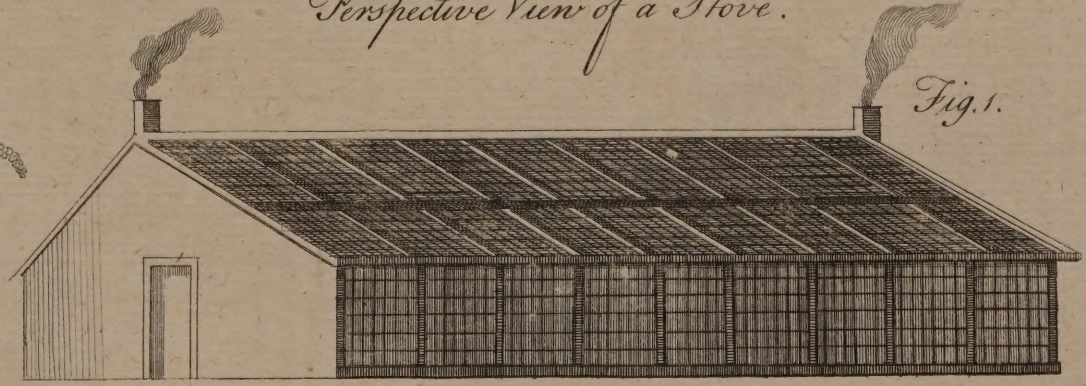
TESTUDO, in antiquity, was particularly uſed among the poets, &c. for the ancient lyre; by reaſon it was originally made by its inventor, Mercury, of the black or hollow ſhell of the teſtudo aquatica, or ſea-tortoiſe, which he accidentally found on the banks of the river Nile.

TESTUDO, in the military art of the ancients, was a kind of cover or ſcreen which the ſoldiers, e. gr. a whole company, made themſelves of their bucklers, by holding them up over their heads, and ſtanding cloſe to each other. This expedient ſerved to ſhelter them from darts, ſtones, &c. thrown

Fig. 4. Testudo.

Perspective View of a Stove.

Fig. 1.



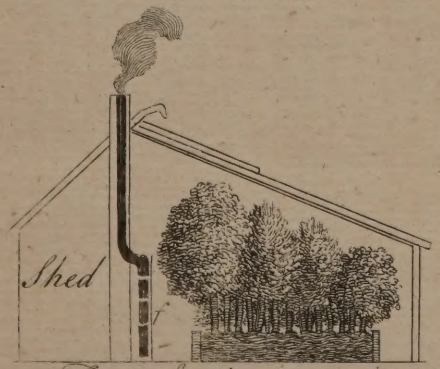


Fig. 3. Section

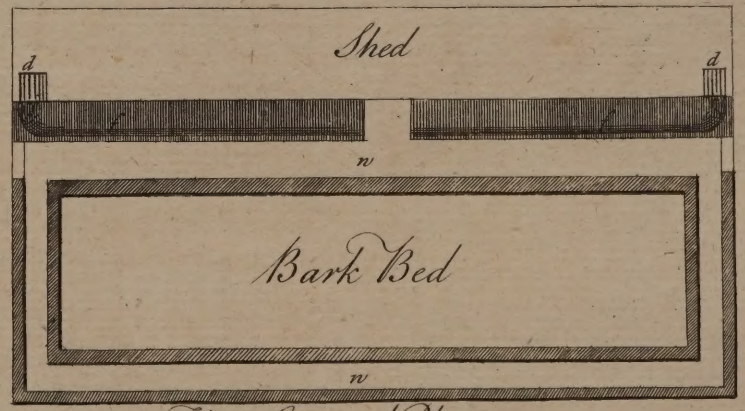


Fig. 2. Ground Plan

A Scale of Feet.

1 2 3 4 5 10 20 30

T. Lodge sculp.

Telescopes.

Fig. 1.

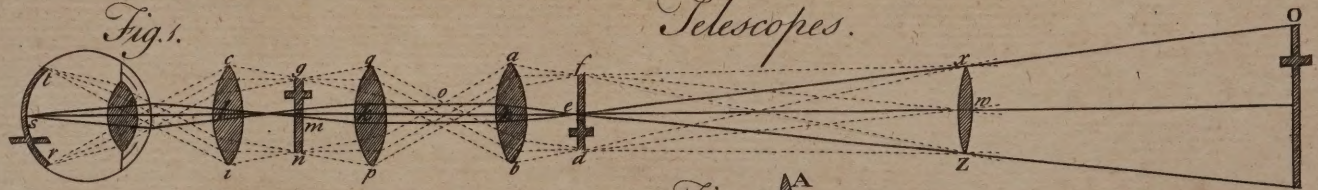


Fig. 2.

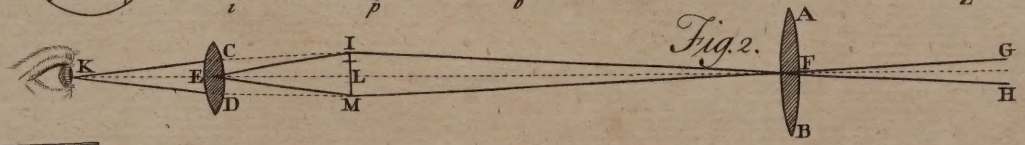


Fig. 6. Tetraedron.

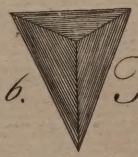


Fig. 3.

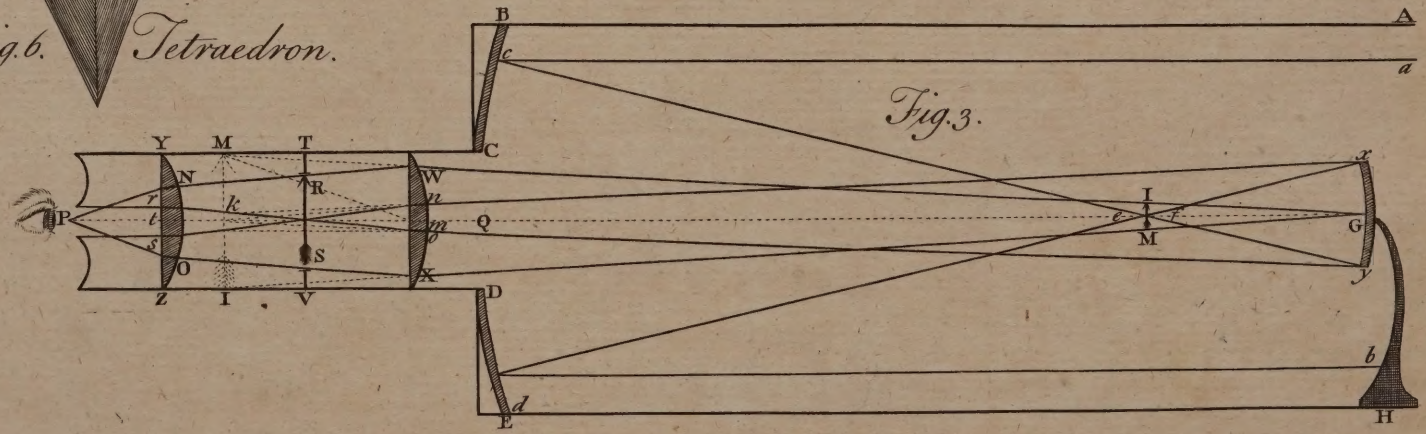


Fig. 4.

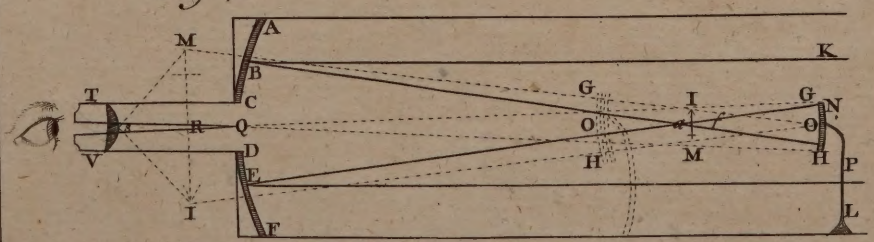
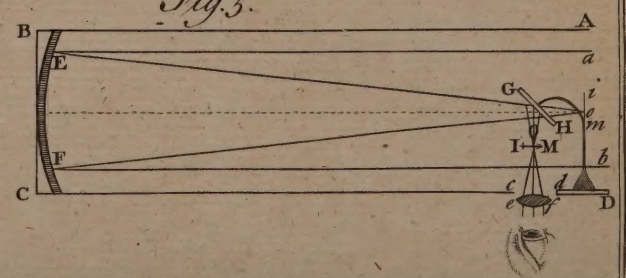


Fig. 5.



thrown upon them, eſpecially thoſe thrown from above, when they went to the aſſault.

TESTUDO was alſo a kind of large wooden tower which moved on ſeveral wheels, and was covered with bullocks hides flead, ſerving to ſhelter the ſoldiers when they approached the walls to mine them, or to batter them with rams.

TETANUS, in medicine, is a convulſive motion that makes any part rigid and inflexible. See CONVULSION.

TETHYS, in ichthyology, a genus of fiſh of the order of the zoophytæ, the body of which is formed as it were of two lips of an oblong cartilaginous body; between them are four tentacula, which have the form of ears, and two perforations in moſt ſpecies near the tentacula.

TETRACERA, in botany, a genus of plants, whoſe flower is hexapetalous, with a perſiſtent cup formed of ſix roundiſh patent leaves, which are alternately ſmaller; it contains a great number of permanent ſtamina, and four ovate germina, which afterwards become ſo many reflexed capſules, each opening by a ſurture in the upper part, and containing one cell, which incloſes a roundiſh ſeed. There is but one ſpecies of this genus, which is a native of the Weſt-Indies, its flowers are produced in ſpikes, and the leaves reſemble thoſe of the bay tree.

TETRACHORD, in the ancient muſic, a concord conſiſting of four degrees or intervals, and four terms or ſounds; called alſo by the antients diateſſaron, and by us a fourth.

This interval had the name tetrachord given it, with reſpect to the lyre and its chords or ſtrings.

TETRADECARHOMBIS, in natural hiſtory, the name of a genus of foſſils, of the claſs of the ſelenitæ, expreſſing a rhomboidal body, conſiſting of fourteen planes, See SELENITÆ.

The characters of this genus are, that the bodies of it are exactly of the ſame form with the common ſelenitæ; but that in theſe each of the end-planes is divided into two, and there are, by this means, eight of theſe planes inſtead of four. Of this genus there are only three known ſpecies.

TETRADIAPASON, a muſical chord, otherwiſe called a quadruple diapaſon, or eighth.

TETRADITÆ, a name given to ſeveral different ſects of heretics. The ſabbathians were called tetraditæ, from their keeping Eaſter-day on the fourth day, or on Wedneſday. The manichees, and others who admitted of a quaternity inſtead of a trinity in the Godhead, were alſo called tetraditæ. The followers of Petrus Fullenſis had the ſame appellation, by reaſon of the addition they made to the triſagion, to ſupport an error they held, that in our Saviour's paſſion it was not any particular perſon of the Godhead that ſuffered, but the whole Deity.

TETRADYNAMIA, in botany, the name of the fifteenth claſs of plants in Linnæus's ſyſtem: this claſs conſiſts of ſuch plants as bear hermaphrodite flowers, and furniſhed with ſix ſtamina, two of which are ſhorter than the reſt, by which circumſtance they are diſtinguiſhed from thoſe of the hexadria claſs. The general characters are theſe; the calyx is an oblong perianthium, compoſed of four leaves, which are ovato-oblong, concave, obtuſe, connivent, gibbous at the baſe, the oppoſite ones equal, and deciduous; this cup is properly a nectarium, which is the reaſon of the baſe being gibbous; the corolla is called cruciform, it conſiſts of four equal petals which have ungues ſomewhat longer than the cup, theſe are erect and flatly ſubulated; the petals are broad at the top, obtuſe, and the ſides hardly touching each other, the inſertion of the petals is in the ſame circle with the ſtamina. The filaments are ſubulate, and ſix in number, of which two that are oppoſite are of the length of the cup, the other four are ſomewhat longer, but not ſo long as the corolla; the antheræ are oblong and pointed, thicker at the baſe, and erect, with the tops bending outwards; the nectariferous glandule, which in different genera has various appearances, is uſually placed near the filaments, and particularly to the two ſhorter ones, to whoſe baſe it is faſtened; theſe two filaments have a light curvature to prevent their preſſing upon the glandule, which is the reaſon they become ſhorter than the others; the germen of the piſtillum is placed above the receptacle, and is every day in its growth raiſed higher and higher; the ſtyle in ſome genera is wanting, but thoſe plants as have it are of the length of or longer than the ſtamina; the ſtigma is always obtuſe; the fruit, or pericarpium, is a bivalvular pod, which often contains two cells; this, when ripe, opens by ſplitting from the apex to the baſe; and it has always a little membranaceous ſubſtance, ſerving within as a ſeptum, when the pod is biloculars; this projects beyond the apex, and is the rudiments of what was the ſtyle. The ſeeds are roundiſh, inclining downwards, alternately plunged lengthways into the diſſepiment, and immerſed in the ſurtures of the pericarpium.

This claſs of plants is truly natural, and has been received as ſuch under whatever name by all the ſyſtematic writers on botany, and includes the cruciformes of Tournefort, and ſiloquoſæ and ſiliculoſæ plants of Ray.

The plants in general belonging to this claſs are held to be antiſcorbutic and diuretic; the taſte in moſt is watery, mixed with a ſharpneſs, but they commonly looſe their virtues when dried.

To this genus of plants belong the ſcurvy-graſs, mithridate-muſtard, cabbage, turnep, radiſh, ſtock-gilliflower; with ſeveral other genera.

TETRAEDRON, or TETRAHEDRON, in geometry, one of the five regular or Platonic bodies or ſolids, comprehended under four equilateral and equal triangles. See plate LXXXVI. fig. 6.

It is demonſtrated by mathematicians, that the ſquare of the ſide of a tetraedron is to the ſquare of the diameter of a ſphere, wherein it may be inſcribed, in a ſubſequialteral ratio: whence it follows, that the ſide of a tetraedron is to the diameter of a ſphere it is inſcribed in, as $\sqrt{2}$ to the $\sqrt{3}$, conſequently they are incommenſurable.

TETRAGON, in geometry, a general name for any four-ſided figure, as a ſquare, parallelogram, rhombus, or trapezium.

TETRAGONIA, in botany, a genus of plants, whoſe flower is deſtitute of a corolla; the cup is permanent and coloured, and formed of four oval plane diflexed leaves, and contains about twenty capillary filaments, which are terminated with oblong incumbent antheræ: the fruit is a coriaceous cruſt, with four angles, each having a longitudinal wing or border, and contains four cells, each incloſing a ſingle oſceous ſeed, which includes four oblong kernels.

The ſpecies belonging to this plant are natives of the cape of Good-Hope.

TETRAGONOTHECA, in botany, a genus of plants, whoſe flower is compound and radiated, being formed of hermaphrodite and female corollulæ; the hermaphrodite, which compoſe the diſc, are numerous and funnel-ſhaped, and the radius is formed of twelve ligulated female florets, which have their extremities cut into three equal acute ſegments; the receptacle is paleaceous, and the ſeeds are ſolitary, roundiſh, and without any down.

TETRAGRAMMATON, a denomination given by the Greeks to the Hebrew name of God, Jehovah, becauſe conſiſting of four letters.

TETRAGYNIA, in botany, the name of an order or ſubdiviſion in the Linnæan ſyſtem, and is applied to thoſe plants whoſe flowers have in each four piſtils or female parts of generation. See the article BOTANY.

TETRAMETER, in ancient poetry, an iambic verſe, conſiſting of four meaſures, or eight feet. This kind of verſe is only found in the comic poets, as Terence, &c.

TETRANDRIA, in botany, the name of the fourth claſs in the Linnæan ſyſtem; it comprehends all thoſe plants whoſe flowers are hermaphrodite and furniſhed with four equal ſtamina, or male parts, in each. To this claſs belong the teaſel, ſcabious, madder, plantain, holly, with ſeveral other genera.

TETRAO, in ornithology, a genus of birds, of the order of the gallinæ, diſtinguiſhed by having the part of the forehead over the eyes naked and papilloſe.

This genus comprehends the urogallus major, or wood-cock; the urogallus minor, or growſe; the moor-cock, lagopus, &c.

TETRAHEDRON, or TETRAEDRON. See TETRAEDRON.

TETRAPETALOUS FLOWERS, among botaniſts, are thoſe whoſe corolla conſiſts of four petals; ſuch compoſe the claſs tetradynamia. See the article TETRADYNAMIA.

TETRAPHARMACUM, ſignifies any remedy conſiſting of four ingredients.

TETRAPLA, in church hiſtory, a bible diſpoſed by Origen under four columns, in each whereof was a different Greek verſion, viz. that of Aquila, that of Symmachus, that of the Seventy, and that of Theodotion. See IBLE.

TETRAPTERA, in the hiſtory of inſects, a name given to that order of inſects,, which have four wings.

TETRAPTOTE, *Tetraptoton*, in grammar, a name given to ſuch defective nouns as have only four caſes; ſuch are *vicis*, *pecudis*, *ſordis*, &c. as being deprived of the nominative and vocative ſingular.

TETRAPYRAMIDIA, in natural hiſtory, the name of a genus of ſpars, influenced in their ſhape by an admixture of particles of tin, and found in form of broad-bottomed pyramids of four ſides. See the article SPAR.

Of this genus there is only one known ſpecies, which is uſually of a browniſh colour, and found in Saxony, as alſo in Devonſhire, Cornwall, and other counties of England, where there is tin.

TETRARCH, *Tetrarcha*, a prince who holds and governs a fourth part of a kingdom. Such originally was the import of the title tetrarch; but it was afterwards applied to any petty king or ſovereign, and became ſynonymous with ethnarch.

TETRASTITCH, a ſtanza, epigram, or poem, conſiſting of four verſes.

TETRASTYLE, in the ancient architecture, a building, and particularly a temple, with four columns in its front.

TETRASYLLABICAL, a word conſiſting of four ſyllables.

TETRATONON, in muſic, a name whereby the ſuperfluous fifth is ſometimes called, as containing four tones.

TEUCRIUM, germander, in botany, a genus of plants, whoſe flower is monopetalous and ringent, the tube of which is cylindric and ſhort, the upper-lip is erect and deeply divided into two acute ſegments, and the lower-lip is ſpreading and trifid, the lateral ſegments are like thoſe of the upper one, but the middle one is large and roundiſh; there is no pericarpium, but the ſeeds, which are roundiſh and four in number, are lodged in the bottom of the cup.

To this genus Linnæus has added the polium chamædrys and chamæpitys of Tournefort, with the ſcordium and marum ſyriadum of other authors.

The leſſer creeping germander is accounted ſplenetic, hepatic, and diuretic, and good in intentions where deterging is wanted; it is alſo accounted

counted an alexipharmic, and has been reckoned as a ſpecific againſt the gout.

TEUTONIC, ſomething belonging to the Teutons, an ancient people of Germany, inhabiting chiefly along the coaſts of the German ocean: thus, the Teutonic language is the ancient language of Germany, which is ranked among the mother tongues. The Teutonic is now called the German or Dutch, and is diſtinguiſhed into upper and lower. The upper has two notable dialects, viz. 1. The Scandian, Daniſh, or perhaps Gothic; to which belong the languages ſpoken in Denmark, Norway, Sweden, and Iceland. 2. The Saxon, to which belong the ſeveral languages of the Engliſh, Scots, Friſian, and thoſe on the north of the Elbe. To the lower belong the Low Dutch, Flemiſh, &c. ſpoken through the Netherlands, &c.

TEUTONIC ORDER, a military order of knights, eſtabliſhed towards the cloſe of the twelfth century, and thus called, as chiefly conſiſting of Germans or Teutons.

TEXT, a relative term, contradiſtinguiſhed to gloſs or commentary, and ſignifying an original diſcourſe excluſive of any note or interpretation. This word is particularly uſed for a certain paſſage of ſcripture, choſen by a preacher to be the ſubject of his ſermon.

TEXTUARIES, *Textuarii*, a name given the ſect of the Caraites among the Jews. See the article CARAITES.

TEXTURE, *Textura*, properly denotes the arrangement and coheſion of ſeveral ſlender bodies or threads interwoven or entangled among each other, as in the webs of ſpiders, or in cloths, ſtuffs, &c.

Texture is alſo uſed in ſpeaking of any union or conſtituent particles of a concrete body, whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compreſſing, attracting, or any other way. In which ſenſe we ſay a cloſe compact tecture, a lax porous texture, a regular or irregular texture, &c. A great deal depends on the texture of the component parts of a body; hence moſt of its particular properties, its ſpecific gravity, colour, &c.

THALAMI *nervorum opticorum*, in anatomy, two oblong prominences of the lateral ventricles of the brain, medullary without, but a little cineritious within, being thus called becauſe the optic nerves riſe out of them.

THALIA, in botany, a genus of plants, whoſe characters are not perfectly known; the cup is a perianthium, the corolla conſiſts of five ovato-oblong petals, which are waved and concave; the ſtamina conſiſts of a ſingle filament with the antheræ not deſcribed; the germen is egg-ſhaped, and the fruit is an ovate unilocular drupe, containing an oſſeous nut with two cells.

This is the ſame with the cortuſa of Plumier.

THALICTRUM, meadow-rue, in botany, a genus of plants, whoſe flower conſiſts of four roundiſh, obtuſe, concave, deciduous petals, with a great number of filaments, broad and compreſſed towards their tops, and terminated with oblong erect antheræ; there is no pericarpium, but the germina, which are numerous and collected in a head, becomes each a furrowed, ovate, and muticated ſeed.

The common meadow-rue grows in moiſt places and by the ſides of brooks in ſeveral parts of England. The ſtalks riſe about five or ſix feet high, and are ſtiff, furrowed, branched, hollow, and generally of a reddiſh colour; the leaves are large, of a ſhining green, and divided into ſeveral jags, and the flowers grow on the tops of the branches. The root purges like rhubarb, tinging the urine with a yellow colour, and is ſaid to have the ſame qualities in all reſpects except the quantity, which muſt be three times as much; and the juice of the leaves and flowers is accounted good for internal bleedings.

THANE, or THAIN, *Thanus*, a name of an ancient dignity among the Engliſh and Scots, or Anglo-Saxons.

Skene makes thane to be a dignity equal to the ſon of an earl. Camden will have it, that thanes were only dignified by the offices they bore. There were two kinds or orders of thanes; the king's thanes, and the ordinary thanes: the firſt were thoſe who attended the king in his courts, and who held lands immediately of the king. The ordinary thanes, or the thani minores, were the lords of the manors, who had particular juriſdiction within their limits, and over their own tenants; theſe changed their names for that of barons, and hence their courts are called courts baron to this day.

THANE-LANDS, were lands granted by charters of our ancient kings, to their thanes, with all immunities, except the three-fold neceſſity of expedition, repair of caſtles, and mending bridges.

THAPSIA, deadly-carrot, in botany, a genus of umbelliferous plants, the general corolla of which is uniform: the proper flowers conſiſt each of five lanceolated incurved petals, with the ſame number of capillary ſtamina: the fruit is oblong, ſurrounded longitudinally with a membrane, and ſeparable into two parts, each conſiſting of a large oblong convex ſeed, pointed at each end, having on each ſide a plane border, which is large, undivided, and emarginated at the top and bottom.

This plant is uſed to provoke the menſes, and other evacuations; and externally it is uſed in ointments for the itch, and the like cutaneous diſorders.

THAWING, the reſolution of ice into its former fluid ſtate, by the warmth of the air, &c. See FREEZING.

Boer-

Boerhaave obſerves, that if a ſudden thaw takes place after a long ſharp froſt, which has bound up the rivers, and penetrated the earth's ſurface to a conſiderable depth, it is, uſually, quickly ſucceeded by a multitude of clouds and uncommon heats, and then by thunder and lightening. The reaſon is, that the fat vapours and exhalations raiſed by the ſubterraneous heat, have long remained impriſoned under that covering of the earth, as appears hence, that if the ice of a ditch be broke in the middle of a ſevere froſt, it preſently emits warm vapours, and this the more plentifully, as well as the hotter, by how much the froſt is harder and the ice thicker. As ſoon, therefore, as the exterior frozen turf of earth is ſoftened by warmth, the pent-up vapours immediately eſcape through all the paſſages they can find, and mounting on high, form clouds, which being driven about, and ſometimes illumined by the ſun, produce ſuch effects. Hence, theſe violent thunders in Muſcovy, Sweden, and Denmark, after a thaw.

THEA, the tea-tree, in botany. See the article TEA.

THEATINES, a religious order in the Romiſh church, ſo called from their principal founder John Peter Caraffa, then biſhop of Theate, or Chiete, in the kingdom of Naples, and afterwards pope, under the name of Paul IV. The names of the other founders were Gaetan, Boniface, and Conſiglieri.

Theſe four pious men deſiring to reform the eccleſiaſtical ſtate, laid the foundation of an order of regular clerks at Rome, in the year 1524. Pope Clement VII. approved the inſtitute, and permitted the brethren to make the three religious vows, to elect a ſuperior every three years, and to draw up ſtatutes for the regulation of the order.

They firſt endeavoured, by their example, to revive, among the clergy, the poverty of the apoſtles and firſt diſciples of our Saviour, and were the firſt who aſſumed the title of regular clerks.

THEATRE, *θεατρον*, in antiquity, a public edifice for the exhibiting of ſcenic ſpectacles, or ſhews, to the people; comprehending not only the eminence on which the actors appeared, and the action paſſed, but alſo the whole area of the place, common to the actors and ſpectators. See the articles DRAMA, PLAY, &c.

THEATRE, is alſo uſed, in architecture, chiefly among the Italians, for an aſſemblage of ſeveral buildings, which, by a happy diſpoſition and elevation, repreſents an agreeable ſcene to the eye.

Anatomical THEATRE, in a ſchool of medicine and ſurgery, is a hall, with ſeveral rows of ſeats, diſpoſed in the circumference of an amphitheatre; having a table bearing on a pivot, in the middle, for the diſſection of bodies.

THEBAID, *Thebais*, a celebrated heroic poem of Statius, the ſubject whereof is the civil war of Thebes, between the two brothers, Eteocles and Polynices; or, Thebes taken by Theſius.

THEFT, *Furtum*, in law, an unlawful felonious taking away another man's moveable and perſonal goods, againſt the owner's will, with intent to ſteal them.

It is divided into theft, or larceny, properly ſo called, and petit theft, or petit larceny; the former whereof is of goods above the value of 12 *d.* and is deemed felony; the other, which is of goods under that value, is not felony. See the articles FELONY and LARCENY.

THELIGONUM, in botany, a genus producing male and female flowers on the ſame plant, neither having any corolla: the male flower conſiſts of a monophyllous turbinated cup, divided into two revoluted ſegments, and contains a number of erect ſtamina: the female flower conſiſts of a ſmall, erect, bifid cup, containing a globoſe germen, which turns to a coriaceous, round, unilocular capſule, which incloſes a globoſe ſeed.

This is the ſame with the cynocrambe of Tournefort.

THEME, in matters of education, denotes the ſubject of an exerciſe, for young ſtudents to write or compoſe on.

THENAR, in anatomy, the abductor-muſcle of the thumb; it has its origin in the tranſverſe ligament that joins the bones of the carpus, and its termination in the firſt and ſecond phalanx; the two ſeſamoide bones of the thumb are uſually found lodged in the tendon of this muſcle.

THENAR, is alſo the abductor-muſcle of the great-toe; it has its origin from the internal ſide of the calcaneum, and the os naviculare; and its termination at the internal ſide of the great toe, beſide the internal ſeſamoide bone.

THEOBROMA, in botany, a genus of plants, whoſe flower conſiſts of a triphyllous cup, and five gibbous concave petals, each of them armed with a bifid ſeta, divided like two horns; the nectarium is bell-ſhaped and erecto-patent; the filaments are numerous, and joined in five bodies, and topped with roundiſh antheræ: the fruit is a woody cortex of an unequal ſurface, with five ridges opening in five cells, each containing ſeveral fleſhy ſeeds of almoſt an oval figure.

This genus includes the cacao of Tournefort, and the guazuma of Plumier; the former of which has an oblong quinquangular fruit, lengthened at each extremity, containing the ſeeds of which the chocolate is made. See CACAO and CHOCOLATE.

The guazuma has a ſubgloboſe fruit, covered with rough tubercles, and its bark perforated in the manner of a ſieve. They are all natives of the Weſt-Indies.

THEODOLITE, a mathematical inſtrument much uſed in ſurveying, for the taking of angles, diſtances, &c.

It is made variouſly, ſeveral perſons having their ſeveral ways of contriving it, each more ſimple and portable, more accurate and expeditious than others. The common one conſiſts of a braſs circle about a foot diameter, cut in the form repreſented in plate LXXXVII. fig. 1. having its limb divided into 360 degrees, and each degree ſubdivided either diagonally, or otherwiſe, into minutes.

Underneath, at *c c*, are fixed two little pillars *b b* (fig. 2.) which ſupport an axis, whereupon is fixed a teleſcope conſiſting of two glaſſes, in a ſquare braſs tube, for the viewing of remote objects.

On the center of the circle moves the index C, which is a circular plate, having a compaſs in the middle whoſe meridian line anſwers to the fiducial line *a a*: at *b b*, are fixed two pillars to ſupport an axis which bears a teleſcope like the former, whoſe line of collimation anſwers to the fiducial line *a a*. At each end of either teleſcope, is fixed a plain ſight for the viewing nearer objects.

The ends of the index *a a* are cut circularly, to fit the diviſions of the limb B; and when that limb is diagonally divided, the fiducial line at one end of the index ſhews the degrees and minutes upon the limb. The whole inſtrument is mounted with a ball and ſocket, upon a three-legged ſtaff.

Moſt theodolites have no teleſcopes, but only four plain ſights, two of them faſtened on the limb, and two on the ends of the index.

Mr. Siſſon's improved theodolite being one of the beſt of theſe inſtruments, we ſhall here give its deſcription, fig. 3. The three ſtaves, whereby it is ſupported, ſcrew into bell-metal joints by braſs-ferrils at top, which are moveable between braſs-pillars fixed in a ſtrong braſs-plate; in which, round the center, is fixed a ſocket with a ball moveable in it, and upon which the four ſcrews preſs that ſet the limb horizontal. Next above is ſuch another plate, through which the ſaid ſcrews paſs, and on which, round the center, is fixed a fruſtum of a cone of bell-metal, whoſe axis, being connected with the center of the ball, is always perpendicular to the limb, by means of a conical braſs ferril fitted to it, whereon is fixed the compaſs-box, and on it the limb, which is a ſtrong bell-metal ring, whereon are moveable three braſs indexes, in whoſe plate are fixed four braſs-pillars, that joining at top hold the center-pin of the bell-metal double ſextant, whoſe double index is fixed in the center of the ſame plate. Within the double ſextant is fixed the ſpirit-level, and over it the teleſcope. See the article LEVEL.

The compaſs box is graved with two diamonds for north and ſouth, and with 20 degrees on both ſides of each, that the needle may be ſet to the variation, and its error alſo known.

The limb has two fleur-de-luces againſt the diamonds in the box, and is curiouſly divided into whole degrees, and numbered to the left hand at every 10° to twice 180°, having three indexes (with Nonius's diviſions on each for the decimals of a degree) that are moved by a pinion fixed below one of them without moving the limb, and in another is a ſcrew and ſpring under, to fix it to any part of the limb: it has alſo diviſions numbered for taking the quarter girt in round timber; to which a ſhorter index is uſed, having Nonius's diviſions for the decimals of an inch; but an abatement muſt be made for the bark, if not taken off. See RULE.

The double ſextant is divided on one ſide from under its center (when the ſpirit tube and teleſcope are level) to above 60 degrees each way, and numbered at 10, 20, &c. And the double index (through which it is moveable) ſhews on the ſame ſide the degree and decimal of any altitude, or depreſſion to that extent, by Nonius's diviſions; on the other ſide are diviſions numbered for taking the upright height of timber, &c. in feet, when diſtant ten feet, which at 20 muſt be doubled, and at 30 trebled; and alſo the quantities for reducing hypothenuſal lines to horizontal: it is moveable by a pinion fixed in the double index.

The teleſcope is a little ſhorter than the diameter of the limb, that a fall may not hurt it; yet it will magnify as much, and ſhew a diſtinct object as perfect, as moſt of treble its length: in its focus are very fine croſs wires, whoſe interſection is in the plane of the double ſextant, and this was a whole circle, and turned in a lathe to a true plane, and is fixed at right angles to the limb; ſo that whenever the limb is ſet horizontal (which is readily done by making the ſpirit-tube level over two ſcrews, and the like over the other two) the double ſextant and teleſcope are moveable in a vertical plane, and then every angle taken on the limb (though the teleſcope be never ſo much elevated or depreſſed) will be an angle in the plane of the horizon, and this is abſolutely neceſſary in the plotting an horizontal plane.

THEOGONY, that branch of the heathen theology, which taught the genealogy of their gods.

THEOLOGY, or DIVINITY, a ſcience which inſtructs us in the knowledge of God or divine things; or which has God, and the things he has revealed, for its object. See the article GOD.

Hence theology may be diſtinguiſhed into natural, which comprehends the knowledge we have of God from his works, by the light of reaſon alone; and ſupernatural, which contains what we are taught concerning God in revelation.

Theology is again diſtinguiſhed into poſitive, moral, and ſcholaſtic. Poſitive theology is the knowledge of the holy ſcriptures, and of the ſignification thereof, conformably to the opinions of the fathers and councils, without the aſſiſtance of any argumentation. Some will have it that this ought to be called expoſitive, rather than poſitive.

Moral theology, is that which teaches us the divine laws relating to our manners and actions. Scholaſtic, or ſchool theology, is that which proceeds by reaſoning; or that derives the knowledge of ſeveral divine things from certain eſtabliſhed principles of faith.

THEOPHRASTA, in botany, a genus of plants, whoſe flower is monopetalous, campanulated, and divided at the edge into five obtuſe ſegments, and contains five ſubulated ſtamina; the fruit is a large globoſe unilocular capſule, containing many roundiſh ſeeds.

This genus comprehends the Ereſia of Plumier.

THEORBA, THIORBA, or TIORBA, a muſical inſtrument made in form of a large lute, except that it has two necks or juga, the ſecond and longer whereof ſuſtains the four laſt rows of chords which are to give the deepeſt ſounds.

THEOREM, a ſpeculative propoſition, demonſtrating the properties of any ſubject.

Theorems are either univerſal, which extend to any quantity, without reſtriction univerſally; as this, that the rectangle of the ſum, and difference of any two quantities, is equal to the difference of their ſquares: or particular, which extend only to a particular quantity; as this, in an equilateral right-lined triangle, each of the angles is 60 degrees.

THEORETIC, or THEORETICAL, ſomething relating to theory, or that terminates in ſpeculation.

THEORY, in general, denotes any doctrine which terminates in ſpeculation alone without conſidering the practical uſes and application thereof.

THERAPEUTÆ, a term applied to thoſe who are wholly employed in the ſervice of religion. This general term has been applied to particular ſects of men, concerning whom there have been great diſputes among the learned.

THERAPEUTICE, THERAPEUTICS, that part of medicine which acquaints us with the rules that are to be obſerved, and the medicines to be employed in the cure of diſeaſes.

THERAPHIM, or TERAPHIM, certain images, or ſuperſtitious figures mentioned in ſcripture. Some Jewiſh writers tell us, the theraphim were effigies of human heads, placed in niches, and conſulted as oracles. Others ſay, they were taliſmans, or figures of metal, caſt and engraved under certain aſpects of the planets; to which they aſcribed extraordinary effects. All the eaſtern people are much addicted to this ſuperſtition; and the Perſians ſtill call them telefin, a name nearly approaching to theraphim.

The learned Spencer makes the word theraphim to be the ſame as ſeraphim, by change of the S into T: whence it follows, that theſe images were repreſentations of theſe angels called ſeraphim. M. Jurien ſuppoſes them to have been a ſort of dii-penates, or houſhold gods.

THERMOMETER, an inſtrument for meaſuring the increaſe and decreaſe of the heat and cold of the air, by means of the elaſtic and expanſive power of bodies of the fluid ſort.

Many different ways, methods, and forms of conſtructing ſuch an uſeful inſtrument have been thought of, and invented at ſeveral times for this purpoſe; at firſt air, then oil, then ſpirits of wine, and laſtly, quickſilver, have been every way attempted and tortured in this experiment.

The ſpring of air, being ſooner affected by heat and cold than that of any other fluid, was firſt thought upon as the beſt expedient to anſwer this end; and ſo it really would be, were it not that the weight or preſſure of the atmoſphere affects it alſo at the ſame time; and by acting ſometimes with, ſometimes againſt it, renders the effect by heat or cold very uncertain, and, therefore, the inſtrument uſeleſs. For example: the air in the bottle AF (plate LXXXVII. fig. 2.) will, by its expanſion, when the air grows warmer, raiſe the water higher in the tube than the point H; and if the air be lighter at this time, it will preſs leſs on the ſurface of the water as H, and ſo will ſuffer it to riſe ſtill higher. But if the air be heavier, it will act againſt the ſpring, and not permit it to raiſe the water ſo high. The ſame may be obſerved with reſpect to its contraction by cold; wherefore ſuch an inſtrument, for common or conſtant uſe, will not do at all, though, perhaps, none is better calculated for ſome extemporaneous uſes, as meaſuring the degree of coldneſs in different cellars, or of warmth in divers rooms upon the ſame floor.

It was upon this account found neceſſary to have recourſe to ſome other fluid, which, ſecured from the preſſure of the air in a tube, hermitically ſealed, might expand and contract ſolely by the heat and coldneſs of the air about it. And becauſe moſt fluids are ſubject to freeze or thicken in great degrees of cold, it was ſoon conſidered that ſpirits of wine, a little tinged with cochineal, would beſt anſwer the purpoſe, and accordingly thermometers were generally made therewith, and became of common uſe.

Though the ſpirit of wine thermometers would do very well to ſhew the comparative heat of the air, yet this was far ſhort of the virtuoſo's views, who wanted to explore the various and vaſtly different degrees of heat in other bodies, as boiling water, boiling oils, melted metals, and even fire itſelf, and degrees of cold too, beyond what the ſpirit thermometer can ſhew. For ſpirit in a moderate degree of heat will burſt the tube; and in an intenſe degree of cold will freeze, as the French philoſophers found, who went to meaſure a degree upon the ſurface of the earth under the north polar circle. It having been found by experiment, that linſeed oil required four times the degree of heat to make it boil as water did, it was quickly ſubſtituted inſtead

inſtead of ſpirits for philoſophic uſes. This Sir Iſaac Newton always uſed, and by it diſcovered the comparative degree of heat which makes water boil, which melts wax, which makes ſpirit of wine boil, and melts tin and lead; beyond which we do not find the oil thermometer has been applied; for which reaſon (as alſo for its ſullying the tube) it has been leſs uſed of late.

The mercurial thermometer, which will ſuſtain any degree of heat or cold, as far as any inſtrument of this kind can be expected to do, was invented by Mr. Farenheit, of Amſterdam; and though ſeveral artificers made them as well as he, yet they ſtill go by his name. Dr. Boerhaave uſed only this thermometer. As the mercury very freely and uniformly expands itſelf from hard froſt to the heat of ſummer, ſo one ſort of thoſe thermometers are contrived with a ſcale, to include thoſe extremes only, and the beginning of the diviſions, or 0, is fixed to that altitude of the quickſilver, as is obſerved when water juſt begins to freeze, or ſnow to thaw; for which reaſon that is called the freezing point in the ſcale. This thermometer is ſmall, ſhort, put in a neat frame, and carried in the pocket any where.

But the grand thermometer of Farenheit is graduated after a different manner, as deſtined to a more critical and extenſive uſe. In this the bulb, or large part at the bottom, is not ſpherical, as in common ones, but cylindrical; to the end, that the heat may penetrate and reach the inmoſt parts as ſoon as poſſible, ſo that the whole may expand uniformly together. Hence it is, that in the cylindric bulb the fluid will expand and riſe immediately, whereas in the ſpherical bulb it is ſeen firſt to fall (by the ſudden expanſion of the ball, before the fluid when heated) and then to riſe, by the expanſion of the fluid when heated. We have given a figure, both of Farenheit's mercurial thermometer, and alſo of Sir Iſaac Newton's made with linſeed oil. See plate LXXXVII. fig. 2.

Sir Iſaac's ſeems to be the beſt fitted of any for a ſtandard weather thermometer; and even for any degree of heat which the various ſtates of the human body exhibit; and alſo for thoſe different degrees which vegetation requires in the green-houſe, hot-bed, &c. In all which caſes it is neceſſary there ſhould be one common, unerring, and univerſal meaſure, or ſtandard, which at all times, and at every place, will ſhew the ſame degree of heat, by the ſame expanſion of the fluid, according to which the ſcale ſhould be made in every ſtandard thermometer. In order to this, the tube propoſed ſhould be very nicely weighed, when empty, and then the bulb, and about a tenth part of the length of the tube above it, is to be filled with quickſilver; then it is to be weighed again, and the exceſs of this, above the former weight, will give the weight of the quickſilver poured in; this will give the weight of the 100th part. Let a mark be made with a file upon the tube at the ſurface of the incloſed quickſilver.

Then weigh out nine or ten parcels of quickſilver, each equal to a hundredth part of that firſt put into the tube, and having poured the ſeveral parcels in, one after another, upon the incloſed quickſilver, and marked the tube ſucceſſively at the ſurface of each parcel, you will have the tube divided into proper intervals, which, if the bore of the tube be every where the ſame, will be equal to each other; if not, they will be unequal; and each of theſe intervals is to be divided into ten others, increaſing or decreaſing as the intervals do.

When this is done, the capacity of the tube is divided into thouſandth parts of that of the ball, and the contiguous part of the tube reaching up to the firſt mark. The tube is now to be put into a frame, and by the ſide of it is to be placed a ſcale, divided into thouſandth parts, exactly correſponding to thoſe on the tube; and writing 1000 over-againſt the firſt mark, you write 1010 over-againſt the ſecond, 1020 againſt the third, and ſo on, as you ſee in the figure.

The ſtandard thermometer-tube, and its ſcale, being thus conſtructed, is then to be filled with ſome proper fluid, as linſeed-oil, where great degrees of heat are not propoſed; and mercury is to be uſed, when they are. When the fluid is poured in, it is to be adjuſted in ſuch a quantity, that it may ſtand juſt at the principal point, marked 1000, in water juſt freezing. And here great precaution is to be uſed; for many trials muſt determine this point, to which the fluid muſt always riſe by ſlow degrees, and with an uniform motion.

When this point is well ſecured, all the trouble is over, the ball, being then immerſed in boiling water, ſpirits, oils, melted metals, &c. in ſnow, freezing mixtures, &c. the expanſions, by all the various degrees of heat and cold, will be ſhewn by the number againſt the heights to which the fluid riſes in the tube, in each caſe, theſe are to be wrote on the ſide of the ſcale; and, ſince the ſame degree of heat will cauſe the ſame expanſion of the ſame fluid at all times, it is evident, if thermometers were every where conſtructed in this manner, the obſervations made by them in any part of the world, may be compared together, which cannot otherwiſe be done; whence, this part of philoſophy would receive its final perfection.

By one of thoſe ſtandard thermometers, well made, many more might ſoon be conſtructed with any expanding fluid, without the trouble of graduating their tubes by equal quantities of quickſilver. For having filled the balls, and a convenient part of the tube, with the propoſed fluid, place them all together in a veſſel of cold water; and while it is warming as gently as poſſible, when the oil in the ſtandard-thermometer ſhall ariſe ſucceſſively at the

ſeveral

ſeveral diviſions of its ſcale, at the ſame inſtant of time mark the new tubes at the ſeveral heights of their fluids, and form a ſcale for every tube that ſhall correſpond to thoſe marks. Then, while the liquors ſubſide, by cooling gently, examine whether they nicely agree at the ſeveral marks.

To determine the freezing point in all, they are to ſtand together in the water till it juſt begins to freeze: or, having all the other points duly, that may be deduced very exactly by the rule of proportion.

A thermometer that ſhall vary very ſenſibly by every ſmall variation of heat and cold, as thoſe of the atmoſphere, muſt have a large ball in proportion to the bore of the tube; and, that the heat or cold may ſooner penetrate the innermoſt parts of the liquor, the ball ſhould not be ſpherical, but oblong and flatted like a French flaſk; and the lengths of the tubes ſhould be proportioned to the degrees of heat they are intended to diſcover.

Sir Iſaac Newton graduated his ſtandard-thermometer on both ſides. Thoſe on the right-hand meaſured the heat of the oil; as thoſe on the left, meaſured the bulk thereof: but ſince the latter, as well as the former, begins from a cypher at the freezing point, and is regularly continued upwards by the common diviſions 10, 20, 30, 40, &c. it will equally ſerve both purpoſes; ſince the degree of heat will always be proportioned to the expanſion of the bulk of the fluid above or below the freezing point.

THERMOSCOPE, an inſtrument ſhewing the changes happening in the air with reſpect to heat and cold.

The word thermoſcope is generally uſed indifferently with that of thermometer, though there is ſome difference in the literal import of the two; the firſt ſignifying an inſtrument that ſhews, or exhibits, the changes of heat, &c. to the eye; and the latter an inſtrument that meaſures thoſe changes; on which foundation the thermometer ſhould be a more accurate thermoſcope, &c.

This difference the excellent Wolfius taking hold of, deſcribes all the thermometers in uſe as thermoſcopes; ſhewing that none of them properly meaſures the heat, &c. none of them do more than indicate the ſame. Though their different heights, yeſterday and to-day, ſhew a difference of heat, yet, ſince they do not diſcover the ratio of yeſterday's heat to to-day's, they are not ſtrictly thermometers.

THESIS, a general poſition which a perſon advances, and offers to maintain.

In colleges it is frequent to have placards, containing a number of them, in theology, in medicine, in philoſophy, in law, &c.

THESIUM, in botany, a genus of plants, whoſe coroila is wanting; the flower conſiſts of a monophyllous, turbinated, coloured cup, which is perſiſtent, and divided at the edge into five erect, obtuſe, ſemi-lanceolated ſegments: the ſtamina conſiſts of five ſubulated filaments, inſerted in the baſe of the lacinæ of the cup, and topped with roundiſh antheræ: the piſtil is ſingle; and the ſeed, which is roundiſh and ſingle, is contained in the bottom of the cup.

THIGH, *Femur*, in anatomy, that part of the body of men, quadrupeds, and birds, between the leg and the trunk. See FEMUR.

THIMBLE, an inſtrument made of braſs, ſilver, iron, &c. put on the finger to thruſt a needle thro' any cloth, ſilk, &c. uſed by all ſeamſtreſſes, taylors, &c.

THINKING, a general name for any act or operation of the mind. See MIND.

Chauvinus, with the Carteſians, will have thinking to conſiſt in a certain native inherent motion or agitation of the human mind, whereof itſelf is conſcious; for they conceive it to be no other than the very eſſence of the mind itſelf, or at leaſt its principal and eſſential property. All the materials of thinking are, by Mr. Locke, derived from the two ſources of ſenſation and reflection.

The ſchool-philoſophers uſually divide thinking into intellectual and volitive. Intellectual is ſubdivided into perception, judgment, reaſoning, and method. Volitive thinking, or volition, admits of infinite different modifications, or new determinations.

The doctrine of the Carteſians, who maintain that thinking is eſſential to the human ſoul, and that there is no time when the ſoul does not think, is overturned by Mr. Locke, who ſhews, that in ſleep without dreaming, there is an entire ceſſation of all the modes of thinking.

THIRD, in muſic, a concord reſulting from a mixture of two ſounds, containing an interval of two degrees.

THISTLE, *Carduus*, in botany. See the article CARDUUS.

Fullers-THISTLE. See DIPSACUS.

Globe-THISTLE. See ECHINOPS.

Golden-THISTLE. See SCOLYMUS.

Holy-THISTLE. See CARDUUS BENEDICTUS.

Melon-THISTLE. See CACTUS.

Sow-THISTLE. See SONCHUS.

Torch-THISTLE. See CEREUS.

Order of the THISTLE, or *of St.* ANDREW, a military order of knighthood in Scotland, the riſe and inſtitution whereof is variouſly related by different authors: Leſley, biſhop of Roſs, reports, that the night before the battle between Athelſtan king of Northumberland, and Hungus king of the Picts, a bright croſs, in form of that whereon St. Andrew (the tutelar ſaint of Scotland) ſuffered martyrdom, appeared to Hungus, who having gained the victory, ever after bore the figure of that croſs on his banners. Others aſſert, that Achaius

king of Scotland, firſt inſtituted this order, after having made the famous league offenſive and defenſive with Charlemagne king of France. But although the thiſtle had been acknowledged as the ſymbol of the kingdom of Scotland from the reign of Achaius, yet ſome refer the beginning of this order to the reign of Charles VII. of France. Others place the foundation of it as low as the year 1500.

The chief and principal enſign is a gold collar, compoſed of thiſtles and ſprigs of rue, interlinked with amulets of gold, having pendant thereunto the image of St. Andrew with his croſs, and this motto, NEMO ME IMPUNE LACESSET.

THLASPI, treacle muſtard, in botany, a genus of plants, producing cruciform flowers; the petals are oval, double the length of the cup, having narrow ungues: the ſtamina are ſix filaments, two of which are ſhorter than the reſt, and topped with acuminated antheræ: the fruit conſiſts of a compreſſed heart-ſhaped pod, with an emarginated border, containing two cells, which include ſeveral ſeeds affixed to a ſurture.

There are ſeveral ſpecies belonging to this genus, among which is included the burſa paſtoris, or ſhepherd's pouch.

The wild thlaſpi, which grows naturally in ſeveral parts of England, is ſaid to promote urine, and to diſſolve coagulated blood; and the ſeeds are an ingredient in the mithridate and Venice-treacle. See the article SINAPIS.

THLIPSIS, θλῖψις, a compreſſion of the ſtomach from food, which is offenſive only by its quantity, and not endued with any remarkable quality; or from a conflux of humours, void of acrimony, into the part.

THOMÆANS, THOMEANS, THOMISTS, or *Chriſtians of St.* THOMAS, a people of the Eaſt-Indies, who, according to tradition, received the Goſpel from St. Thomas.

Upon the arrival of the Portugueſe at Calicut, in their firſt voyage to the Indies, they met with ancient Chriſtians, who pretended to be deſcended from thoſe converted by St. Thomas.

St. THOMAS's *Day*, a feſtival of the Chriſtian church, obſerved on December 21, in commemoration of St. Thomas the Apoſtle.

THOMISM, or THOMAISM, the doctrine of St. Thomas Aquinas, and his followers the Thomiſts, chiefly with regard to predeſtination and grace.

THOMISTS, a ſect of ſchool-divines, who maintain Thomiſm. See the preceding article.

THORACIC, *Thoracicus*, a name given to two branches of the axillary artery, on account of their conveying the blood into ſome parts of the thorax. See the article THORAX.

The thoracic arteries are diſtinguiſhed into upper and lower. There are likewiſe thoracic veins, upper and under, deſtined for the conveyance of the blood from the thorax to the axillary vein.

THORACIC DUCT, or CHYLIFEROUS DUCT, a very ſlender canal, receiving the chyle from the chyliferous veſſels, and the lymph from the lymphatics, and carrying them to the thorax, and uſually through it to the ſubclavian vein.

The beginning of this duct is in the reſervoir or receptaculum chyli, which is ſituated in the left ſide of the upper vertebra of the loins, under the aorta, and veſſels of the left kidney; the reſt of the duct has ſome reſemblance of a ſack or bag, and is larger and more irregular in its figure. Its end is uſually in the ſubclavian vein; ſometimes in the jugular. In dogs, and many other animals, its progreſs is under the aorta; but in the human body it aſcends along the right ſide of the vertebra of the back, and paſſes between the aorta and the vena azygos, ſometimes with a ſimple trunk, ſometimes divided into two: its breadth, where divided, is about that of a wheat ſtraw.

The beſt manner of demonſtrating it in animals, is to feed a dog well, and then to ſtrangle him; and as ſoon as the body is opened, to tie it up with a thread in the breaſt, juſt by the ſubclavian; by this means, the ciſtern, or receptacle of the chyle, and the chyliferous veſſels and lymphatics, are all expoſed evidently to view at once.

In a human body, they may alſo be obſerved any time after death, by injecting, according to Salzman, wax, or any fluid, or indeed only by inflating the great lymphatic veſſel, which runs by the left emulgent vein; or, otherwiſe, if, according to Henninger, an injection, or barely an inflation, be made into a lacteal of the ſecond order, to be traced out in the middle of the meſentery; or, finally, if the pleura be carefully cut between the aorta and the vena azygos, the duct will uſually be eaſily found there.

It is compoſed of a fine, thin, and pellucid membrane, and within it there are valves, as in the lacteals and lymphatics, which prevent the reflux of the chyle. There are more of theſe in the human body than in beaſts; and, finally, there is a ſemilunar valve, cloſing its extremity under the ſubclavian.

The uſe of the thoracic duct is to carry the chyle to the blood, through the thorax, as it receives it from the receptacle, and with it the lymph from the lymphatics.

THORAX, in anatomy, that large part of the body ſituated between the abdomen and the neck.

The parts of the thorax are of two kinds, the continent, or containing, and contained: the continent parts, or thoſe which form the cavity, are either common or proper; the common continent parts of the thorax are the cuticula, the cutis and the pinguello.

The continent parts proper or peculiar to the

thorax, are these; the breasts, the pectoral muscles, the intercostals, the diaphragm, the pleura, and, finally, the bones; of these last there are twenty-four ribs, the sternum, and twelve vertebræ.

The contents of the cavity formed by these, or the parts contained in the thorax, are the mediastinum, the lungs, the heart and its pericardium, with the large vessels arising from it, particularly the trunks of the aorta, and the pulmonary artery of the vena cava and pulmonary vein, the thoracic duct, and, finally, the greater part of the œsophagus.

The uses of the parts of the thorax in general, are their serving to respiration and the circulation of the blood, in both sexes; and, in women, to the producing milk.

THORN-APPLE, in botany. See the article DATURA.

THORNBACK, in ichthyology, the prickly raia, with tuberculose teeth, and a transverse cartilage in the belly.

THOUGHT, or sentiment, a general name for all the ideas consequent on the operations of the mind, and even for the operations themselves.

THRASHING, or THRESHING, *Flagellatio*, in agriculture, the art of beating the corn out of the ears.

THRAVE, or THREAVE *of Corn*, twenty-four sheaves, or four shocks of six sheaves to the shock; though, in some countries, they only reckon twelve shocks to the thrave.

THREE, *Rule of*. See the article RULE.

THRENODY, *Threnodia*, a mournful or funeral song.

THRIFT, statice, in botany. See the article STATICE.

THROAT, the anterior part of an animal, between the head and the shoulders, wherein is the gullet.

THROAT, in architecture, fortification, &c. See the article GORGE.

THRONE, θρονος, a royal seat, or chair of state, enriched with ornaments of architecture and sculpture, made of some precious matter, raised on one or more steps, and covered with a kind of canopy. Such are the thrones in the rooms of audience of kings, and other sovereigns.

THROWSTER, one who prepares raw silk for the weavers, by cleansing and twisting it.

THRUSH, in ornithology, two species of turdus, the one called the common thrush, and the other the missel-thrush.

The common thrush is the turdus with a white line over the eyes. This is smaller than the field-fare; the head is small and flatted; the eyes are bright, their iris hazle; the ears patulous; the beak about half an inch long, brown and pointed; the head and back of an olive brown, spotted with a dark colour; the breast is yellow, the belly whitish, and the legs brown.

The other species of turdus, called the missel-thrush, is of a greyish yellow colour with a spotted breast, being the largest of the turdus kind.

THRYALLIS, in botany, a genus of plants, whose flower consists of five roundish patent petals, with ten subulated filaments topped with roundish antheræ; the germen is obtuse, supporting a slender pointal; and the fruit is a three-cornered, triangular, obtuse capsule, opening into three parts, and contains a single, ovate, and very smooth seed.

THUMB, *Pollex*, in anatomy, one of the parts or extremities of the hand. See HAND.

THUMMIM, in the scripture-learning. See URIM and THUMMIM.

THUNDER, a noise in the regions of the air, excited by a sudden kindling of sulphureous exhalations.

Those philosophers who maintain, that vapours are buoyed up in the air by particles of fire adhering to them, account for the phænomena of thunder and lightning in the following manner; they suppose that from the particles of sulphur, nitre, and other combustible matter, which are exhaled from the earth, and carried into the higher regions of the atmosphere, together with the ascending vapours, is formed an inflammable substance, which, when a sufficient quantity of fiery particles is separated from the vapours, by the collision of two clouds, or otherwise, takes fire, and shoots out into a train of light, greater or less, according to the strength and quantity of the materials. This opinion is certainly false; for it is impossible the vapours should be attended with such fiery particles as is here supposed: neither have we occasion to fly to such an hypothesis; for as vapours, exhaled from the surface of the water, are carried up into the atmosphere, in like manner the effluvia of solid bodies are continually ascending thither. Now we find by experience, that there are several inflammable bodies, which, being mixed together in due proportion, will kindle into flame by fermentation alone, without the help of any fiery particles.

Thus, M. Lemery having covered up, in the earth, about fifty pounds of a mixture, composed of equal parts of sulphur and filings of iron, tempered with water; after eight or nine hours time the earth, where it was laid, vomited up flames. Thus also, mix a small quantity of gun-powder with oil of cloves, pour gently upon this mixture two or three times as much spirit of nitre, and you will observe a bright inflammation suddenly arising from it. A mixture of the two fluids alone will take fire, the powder is added only to augment the inflammation. When, therefore, there happens to be a mixture of the effluvia of such bodies floating in the air, they ferment, kindle, and, flashing like gun-powder, occasion those explosions and streams of fire, which we call thunder and lightning.

As to the particular species of the effluvia, which com-

compoſe this mixture, that cannot be exactly determined: they are thought to be chiefly ſulphureous and nitrous; ſulphureous, becauſe of the ſulphureous ſmell which lightning generally leaves behind, and of that ſultry heat in the air, which is commonly the forerunner of it; nitrous, becauſe we do not know of any body liable to ſo ſudden and violent an exploſion as nitre is.

Dr. Liſter is of opinion, that the matter both of thunder and lightning, and alſo of earthquakes, is the effluvia of the pyrites; as he does, that the matter of volcanos is the pyrites itſelf. This is a mineral that emits copious exhalations, and is exceeding apt to take fire upon the admiſſion of moiſture. See the doctor's defence of his notion in the Phil. Tranſ. No. 157. He thinks this may be the reaſon why England is ſo little troubled with earthquakes, and Italy, and almoſt all places round the Mediterranean ſea, ſo very much, viz. becauſe the pyrites are rarely found in England; and, where they are, they lie very thin, in compariſon of what they do in thoſe countries; as the vaſt quantity of ſulphur emitted from the burning mountains there, ſeems to ſhew.

The effects of thunder and lightning are owing to the ſudden and violent agitation the air is put into thereby, together with the force of the exploſion; and not to thunderbolts falling from the clouds, as is ſuppoſed by the vulgar.

Some are inclined to think, that thunderbolts are artificial, and that they were applied by the ancients to ſome uſe. What confirms them in their opinion is, that they are found more frequently where ſepulchres have been, than in other places.

The diſtance the thunder is from us, may nearly be eſtimated by the interval of time between our ſeeing the lightning, and hearing the thunder; for as the motion of light is ſo very quick, that the time it takes up in coming to us from the cloud, is not perceptible; and as that of a ſound is about a thouſand feet in a ſecond; allowing a thouſand feet for every ſecond that paſſes between our ſeeing the one, and hearing the other, we have the diſtance of the cloud, pretty nearly, from whence the thunder comes.

THUNDERING LEGION, *Legio Fulminans*, was a legion in the Roman army, conſiſting of Chriſtian ſoldiers, who, in the expedition of the emperor Marcus Aurelius againſt the Sarmatæ, Quadi, and Marcomanni, ſaved the whole army then ready to periſh of thirſt, by procuring, with their prayers, a very plentiful ſhower thereon, and at the ſame time a furious hail, mixed with lightning and thunderbolts, on the enemy.

This is the account commonly given by eccleſiaſtical hiſtorians, and the whole hiſtory is engraven in baſs-relievos on the Antonine column. And hence aroſe the denomination Thunderers, though ſome ſay, that the legion, thoſe Chriſtians were of, was called the Thundering legion before.

THURSDAY, the fifth day of the Chriſtian week, but the ſixth day of that of the Jews.

Holy THURSDAY, the ſame with aſcenſion-day. See the article ASCENSION.

Maunday-THURSDAY. See the article MAUNDAY-THURDAY.

THUJA, the *Arbor Vitæ*, in botany; this tree is evergreen, and has a ſtrong woody trunk, which riſes to the height of forty feet or more; the bark, while young, is ſmooth, and of a dark brown colour; but as the tree advances in growth, the bark becomes cracked and leſs ſmooth; the branches are produced irregularly on every ſide, ſtanding almoſt horizontal; and the young ſlender ſhoots frequently hang downward; the principal branches ſtand but thin, and the young branches, which are flat, are moſtly furniſhed with leaves; theſe are ſmall, and lay over each other in an imbricated manner. The flowers are produced from the ſides of the young branches, and are male and female; the male flowers grow in oblong katkins, they have no petals, but contain in each four ſtamina, which are ſcarce viſible; the female flowers are collected into a common and almoſt oval cone, which is formed of a number of ſcales, two flowers ſtanding oppoſite in each ſcale. The fruit is an ovato-oblong obtuſe cone, opening longitudinally, having obtuſe ſmooth ſcales, containing one or two oblong ſeeds, having a membranaceous wing.

This kind is a native of Canada, Siberia, and other northern countries; it flowers early in the ſpring, and the ſeeds ripen in September.

Another ſort, which grows naturally in the northern parts of China where it riſes to a conſiderable height, hath its branches growing more cloſe and compact together than thoſe of the common ſort, and is better furniſhed with leaves, which are brighter and have a more elegant appearance, and is therefore held in greater eſteem with us than the former. The leaves of theſe plants have a rank oily ſmell when bruiſed, particularly the firſt mentioned; they are propagated by ſeeds, layers, or cuttings; if from ſeeds (which produce the beſt plants) they ſhould be ſown ſoon after they are ripe, which is in the ſpring; if from layers or cuttings, September is the beſt time, and the ſucceeding autumn they will be fit for tranſplanting into the nurſery, where they may remain till of a proper ſize for planting where they are intended to remain for good.

THYMBRA, mountain hyſſop, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is almoſt cylindric, the upper-lip is concave, and divided into two obtuſe ſegments; the lower-lip is triſid, equal, and plane; the ſtamina are four in number, two of which are ſhorter than the reſt; the germen is quadriſid, and afterwards

wards becomes four ſeeds, which ripen in the cup. The flowers of this genus are produced on the ſtalks in whorled ſpikes, they are of a purple colour, and the leaves, which are pointed, have an aromatic odour and flavour when bruiſed.

THYMELÆA, in botany. See DAPHNE.

THYMUS, the thyme plant, in botany, a genus of plants, the flower cup of which is labiated and perſiſtent, the upper-lip is broad, plane, erect, and tridentated, and the under one ends in two briſtles which are of an equal length. The corolla is monopetalous and ringent; the tube is the length of the cup; the faux, or chaps, are ſmall; the upper-lip is ſhort, plane, erect, obtuſe, and emarginated; the lower-lip is long, patent, broad, trifid, and obtuſe, the middle lacinia being broadeſt; the ſtamina are four incurved filaments, two being longer than the others, and the antheræ are ſmall; there is no pericarpium, but the cup, whoſe neck is narrowed, contains four ſmall roundiſh ſeeds. This genus includes the acinos of Dillenius, and the ſerpyllum of Tournefort, or mother of thyme.

There are ſeveral ſorts of thyme, as the broad-leaved thyme, narrow-leaved thyme, variegated thyme, orange and lemon thyme, ſo called, &c. they are all eaſily propagated, by ſowing their ſeeds or parting their roots, which may be done either in the ſpring or autumn; a dry ſoil is beſt for theſe plants, as their virtues are ſtronger than if growing in moiſt wet lands, and likewiſe they are not ſo apt to be deſtroyed in ſevere winters.

The common thyme has an agreeable aromatic ſmell, and a warm pungent taſte; it therefore not only enters into many culinary compoſitions, but is ſometimes uſed in medicine: it is ſaid to ſtrengthen the brain, and to attenuate and rarify clammy humours; it helps digeſtion, and may be of ſome ſervice in ſhortneſs of breath; the diſtilled ſpirit is an agreeable, aromatic cordial liquor, and not inferior to any thing of the kind.

THYMUS, in anatomy, a gland, which in infants is very remarkable: it is ſituated in the upper part of the thorax, immediately under the ſternum, and lies upon the pericardium, and on the trunk of the aorta, and of the vena cava. It extends itſelf from the pericardium, along the trunk of the aorta, to the beginning of the carotids, ſometimes ſo far as to the thyroide-gland; its figure is irregular and uncertain; its colour in infants is a pale red, in adults it is of a duſkier hue: it is much larger in infants newly born, than in ſubjects at any more advanced period. Its length is there no leſs than three fingers breadth, and its diameter two, its thickneſs is about half a finger: it gradually decreaſes from this ſize, as the child grows up; in adults it is very ſmall, and in old people it entirely diſappears. Its ſubſtance is glandulous and conglomerate, and it is ſurrounded by a membrane. It has blood-veſſels ſometimes from the ſubclavians, ſometimes from the mammary, and ſometimes from the mediaſtine ones; and in ſome ſubjects from the carotids and jugulars. Its lymphatics ſometimes run to the thoracic duct, ſometimes to the ſubclavian veins; and they have in general no valves.

The nerves of the thymus are from the par vagum, or from the intercoſtals. There is ſometimes a milky juice found in this gland, in new-born ſubjects. It has no excretory duct hitherto diſcovered, and its uſe is therefore not certainly known: poſſibly, according to Heiſter, it ſerves to ſecrete lymph, which it diſcharges into the thoracic duct, for the dilution of the blood and of the chyle, as the glands of the meſentery, and of the pancreas do, in regard to the chyle. On this ſuppoſition its uſe is much greater in the fœtus, than at any time after the birth, becauſe the want of reſpiration in that ſtate may well be ſuppoſed to ſubject the blood to be thicker, and to need more dilution than afterwards; nothing tending to attenuate blood ſo much as reſpiration. Bellinger is of opinion, that it prepares a nutritious fluid for the fœtus while in the uterus, and conveys it by particular ducts to its mouth: but it is to be obſerved, that neither Bellinger himſelf, nor any body ſince, have ever been able to find out theſe ducts.

THYROARYTÆNOIDES, in anatomy, a muſcle of the larynx, which, ariſing and terminating in it, ſerves, together with the arytenoides, to conſtringe it. Theſe two muſcles mutually interſect one another, and ſtraiten the glottis; ſometimes there is but one muſcle; and ſometimes it is different from that deſcribed here.

THYROIDE GLAND, in anatomy, is of a very ſingular figure, reſembling that of the new moon. It adheres by its middle part, which is called by authors its iſthmus, to the upper ring of the trachea, and its points or horns are turned upwards. It adheres on each part to the larynx aud œſophagus.

THYROIDE CARTILAGE, one of the five cartilages that principally compoſe the larynx.

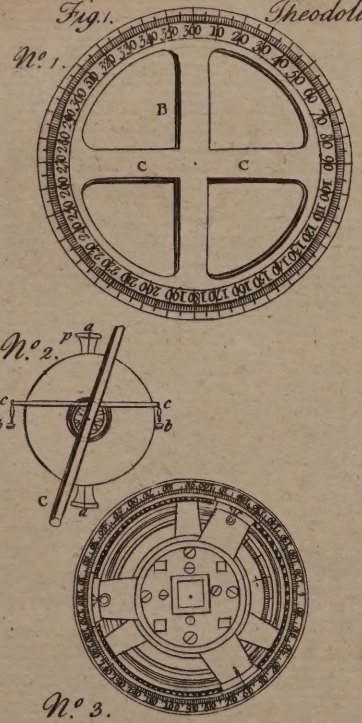
THYROSTAPHYLINUS, in anatomy, the name of a muſcle of the uvula, which, ariſing from the lateral part of the thyroide cartilage, and aſcending towards the uva, becomes larger, and is inſerted in manner of an arch, in the ſide of the velum palatinum.

THYRSUS, in antiquity, the ſceptre which the poets put into the hand of Bacchus, and wherewith they furniſhed the Menades in their Bacchanalia.

The thyrſus was originally a lance or ſpear, wrapped up in vine-leaves, wherewith Bacchus is ſaid to have armed himſelf and his ſoldiers in the Indian wars, to amuſe and deceive the unpractiſed Indians, and make them expect no hoſtilities.

TIARELLA, in botany, a genus of plants, whoſe flower conſiſts of five oblong petals, which are inſerted in the cup: the ſtamina are ten ſlender filaments, longer than the corolla, and topped with roundiſh

Fig. 1. Theodolite.



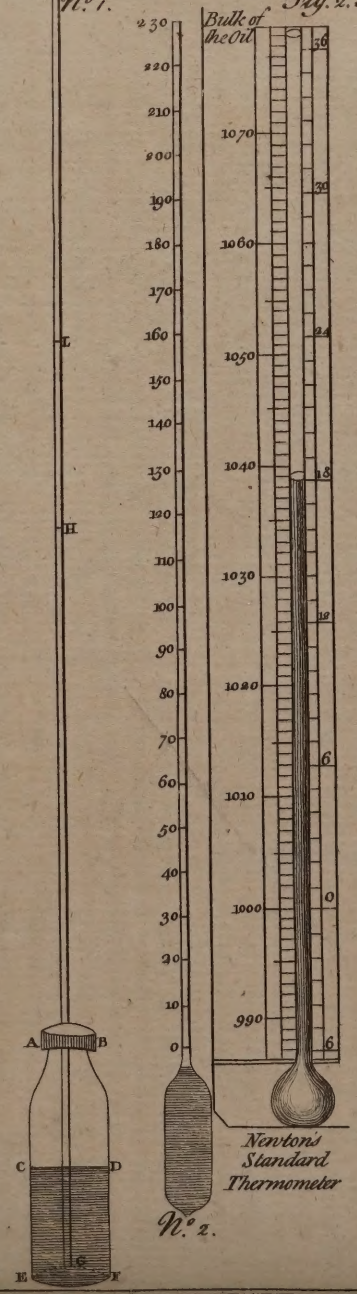
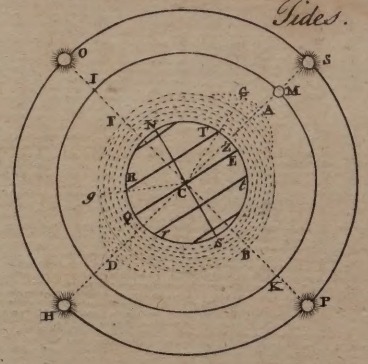


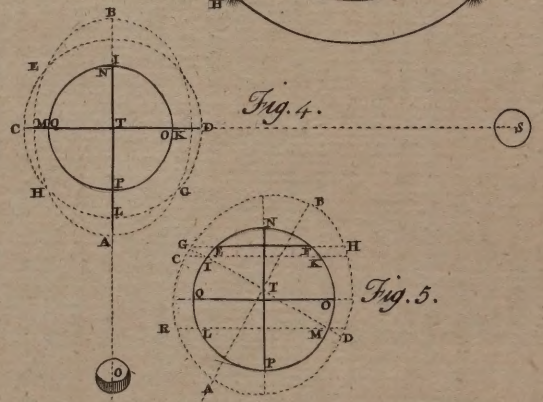
Fig. 2. Thermometer.

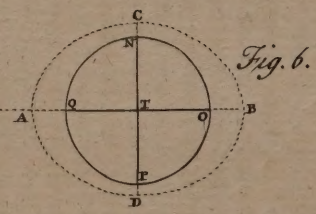
Bulk of the Oil

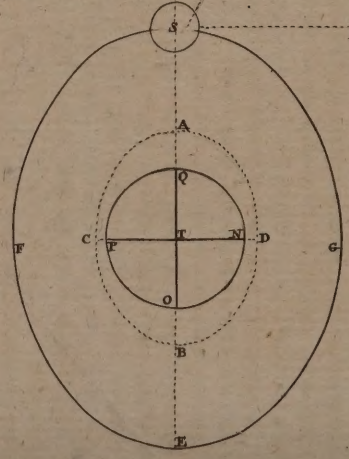
Newton's Standard Thermometer

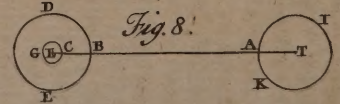
Tides.











roundish antheræ: the germen is bifid and ends in two styles: the fruit is an oblong, unilocular, and bivalvular capsule, containing a number of ovate shining seeds.

TIBIA, in anatomy, is the inner and bigger bone of the leg, called also focile majus: it is hard and firm, with a cavity in its middle; it is almost triangular; its fore and sharp edge is called the shin.

TIBIALIS, or TIBIÆUS, in anatomy, the name of two muscles of the foot, distinguished by the epithets anticus and posticus.

The tibialis anticus, one of the flexor muscles, has its origin from the superior and extensor surface of the tibia, and is terminated at the internal os cuneiforme, and the interior part of the internal metatarsal bone.

The tibialis posticus, or abductor muscle of the foot, has its origin in the upper part of the interosseous ligament, and its termination in the os naviculare. See FOOT and MUSCLE.

TIDES, two periodical motions of the waters of the sea, called the flux and reflux, or the flow and ebb.

The cause of the tides is the attraction of the sun and moon, but chiefly of the latter; the waters of the immense ocean, forgetful, as it were, of their natural quietus, move and roll in tides, obsequious to the strong attractive power of the moon, and weaker influence of the sun.

To illustrate this, let NESQ (plate LXXXVII. fig. 3.) represent the earth, covered over with water ABDF; NS the axis of the earth, EQ the equator, TR the tropic of Cancer, *tr* the tropic of Capricorn, M the moon in her orbit, S the sun in his. Now, since all bodies are endued with an attracting virtue, the moon will attract all the water in the nearest hemisphere FAB, with degrees of force which are inversely as the squares of the distances from all parts; and therefore, with the strongest force where the distance is least, viz. in the point A, directly under her: and this attraction being, in this hemisphere, contrary to that of the earth, the water in all the parts from B to F towards A, will have its gravity decreasing, and be highest of all at the part A; and, consequently, must there stand higher than at the point F, where being more attracted by the earth, it must be heavier and nearer to the center, as is evident by the laws of hydrostatics. See FLUID.

Again, in the hemisphere FDB, the attraction of the moon conspires with that of the earth; but decreasing as the squares of the distances increase, the joint force of attraction will every where decrease from F and B towards D, the point opposite to the moon; where, again, the waters will be lightest, and therefore stand highest to preserve the equilibrium.

Whence it appears, that by this sum and difference of the moon's and earth's attraction, there will necessarily ensue a protuberance or swelling of the waters, which we call tides of flood, in the two points A and D directly under the moon. Also in the two points F and B, as the waters are there most attracted, so they will be heaviest, and consequently rise to the least height from the earth's surface, whence they are called tides of ebb, or the ebbing of the water.

If to the power of the moon we add that of the sun, we shall have the tides considerably augmented at the conjunction in S, or opposition in H, that is, at the new and full moons, which are called the spring-tides; as those which happen when the sun is at O or P, are called neap-tides, the waters at A and D being then lowest, because the attraction of the moon is then counterballanced by that of the sun.

It is further to be observed, that of the two tides of flood at A and D, that at A is greatest to any place T in the northern latitude, when the moon is in the northern signs, and above the horizon; for the point A is then nearer the zenith of the place G, than the opposite point D is to the same place at R twelve hours afterwards; and, consequently, the height of the tide T G is greater than that of the opposite tide R*g*. The contrary of this happens, when the moon is in the southern signs.

That there are two tides of flood and two of ebb, succeeding each other alternately at about the interval of six hours, is obvious from the figure: and that they happen later each day near an hour, is owing to their exact correspondence to the motion of the moon, which daily culminates so much later. That they happen not when the moon is in the meridian, but about three hours after, is owing to the force of the moon being then greater than when in the meridian of any place; as the heat of the day is greater at three o'clock than at twelve; and the heat of the summer is greater in August than at the 21st of June. Lastly, that the greatest spring tides happen not at the 21st of March, and 23d of September, but in February and October, is because the sun being nearest the earth in December, his influence is then strongest, and so must quicken the time of the greatest vernal tides; and being weakest in June, the time of the autumnal tides will necessarily be retarded.

The sum of what has been said is this: if NOPQ (fig. 4) be the surface of the earth, T its center, IFKGLHCE a circle representing the spherical surface of the waters covering the earth, and affected only by the attractive power of the earth: upon placing an attracting body at S, the waters will no longer continue their spherical figure, but be immediately drawn into the spheroidal figure ACBD, in such manner, as to be depressed at C

and D to M and K, and elevated from L and I to A and B; and the elevation A L or B I, is double the depreſſion C M or D K. That if S be the ſun, then A P — O K = A L + K D = 25 inches; or 11½ feet, if S be the moon. That at the points E, F, G, H, (which are called the octants) the water is neither elevated nor depreſſed. That if any other body be placed at O (as the moon) in the ſame right-line T S; then by the joint influence of both S and O, the elevation at A and B will be increaſed, and the depreſſion at C and D likewiſe. Laſtly, if S be in the ſituation *S*, or vertical to the point D, it is plain its action to raiſe the water D will be directly contrary to that of the moon in depreſſing it there; wherefore the depreſſion will not be ſo great as before; for the ſame reaſon the elevation at A and B will be diminiſhed, being now only as the difference of the two forces, whereas before they were as the ſum.

We ſhall now conſider the phænomena of the tides which remain; and firſt, it is evident, that if P N be the axis of the earth, and Q O the diameter of the equator, then the moon ſituated at O, over one of the poles, would accumulate the water over each pole, and the ſpheroid would be ſo poſited as to have its longeſt axis A B coinciding with the axis of the earth P N. In this poſition of the ſpheroid, it is plain, there could be no ſuch thing as a tide in any part of the ocean over all the earth; for every ſection of the ſpheroid, parallel to the equator, would be a circle; conſequently in any parallel of latitude, the water would be at equal diſtance from the earth's ſurface every moment of the diurnal revolution, or natural day.

Suppoſe the moon were removed from the direction of the earth's axis, and poſited at S (fig. 5.) then will the axis of the aqueous ſpheroid A B be turned towards S, and make an angle with the earth's axis, as A T P or B T N. Then we obſerve, that ſince C, D, are the places of loweſt water, that parallel I K which paſſes through the point I on one ſide the equator, and L M which paſſes through M on the other, will divide the earth into three zones, in two of which, viz. E N K and L P M, there will be but one tide each day, of the ſame kind; for inſtance, in the parallel E F, a perſon at F will have high water, and at E low water for twelve hours after. Again, in all the zone I K M L, there will be two tides of the ſame kind each day, as is evident from the figure. Theſe limits, or the arch Q I or O M, is the complement of the moon's declination from the equator.

If the moon at S (fig. 6.) be over the equator, the longer axis of the ſpheroid A B will now coincide with the plane of the equator Q O, and the ſhorter axis C D with the axis of the earth N P. Here it is obvious, that in this ſituation of the ſpheroid, the waters in the parts A B, with reſpect to thoſe at C D, will give the greateſt difference of high and low water poſſible to all parts of the earth; and that there is no place but thoſe two at the poles N, P, but what has two tides of flood, and two of ebb every twenty-four hours. And this difference of the flux and reflux will decreaſe from the equator to the poles.

It has been already obſerved, that the greateſt elevation of the waters is not when the luminary is in the meridian, but about three hours after, becauſe the motion communicated to the waters during the arrival of the meridian is not immediately deſtroyed, but remains ſome time, and receives a farther augmentation from that which is impreſſed for about three hours after. For the ſame reaſon, we obſerve, the greateſt and leaſt tides happen not on the day of the ſyzygy, or quadrature, but on the third or fourth after; the ſum or difference of the forces of the luminaries not being till then at a maximum. See the article SYZYGY.

Let S F E G (fig. 7.) be the orbit of the moon about the earth Q N O P, which as it is not circular but elliptical, the center of the earth, T, will not be always at an equal diſtance from the moon; but the moon will be ſometimes neareſt the earth, as when at S, and ſometimes fartheſt off, as at E. The point S is called the perigæum, or perigee; and the point E the apogæum, or apogee. The power of the moon in her perigee is to that in the apogee nearly as TE^3 to TS^3; and conſequently the greateſt tides will be on the day of the perigee, or rather a few days after, for the reaſons abovementioned. Such would the tides regularly be, if the whole earth were covered with deep ſea; but by reaſon of the ſhoalneſs of ſome places, and the narrowneſs of the ſtreights, by which the tides are, in many places, propagated, there ariſes a great diverſity in the tides, not to be accounted for without an exact knowledge of all the circumſtances of the ſeveral places where they happen; as of the poſition of the land, the breadth and depth of channels, &c.

That the tides may have their full motion, the ocean in which they are produced ought to be extended from eaſt to weſt 90°, or a quarter of a great circle of the earth, at leaſt; becauſe the places where the moon raiſes moſt, and moſt depreſſes the water, are at that diſtance from one another. Hence it appears, that it is only in the great oceans that ſuch tides can be produced; and why, in the large Pacific ocean, they exceed thoſe in the Atlantic ocean: hence alſo it is obvious, why the tides are not ſo great in the torrid zone, between Africa and America, where the ocean is narrower, as in the temperate zones on either ſide; and from this alſo we may underſtand why the tides are ſo ſmall in iſlands, that are very far diſtant from the ſhores. It is manifeſt, that, in the Atlantic ocean, the water cannot riſe on one ſhore but by deſcending on the other; ſo that, at the intermediate diſtant iſlands, it muſt continue at about a mean height

betwixt its elevation on the one and on the other ſhore.

As the tides paſs over ſhoals, and run through ſtreights into bays of the ſea, their motion becomes more various, and their height depends on a great many circumſtances.

The tide that is produced on the weſtern coaſt of Europe, correſponds to the theory above deſcribed: thus, it is high water on the coaſt of Spain, Portugal, and the weſt of Ireland, about the third hour after the moon has paſſed the meridian: from thence it flows into the adjacent channels, as it finds the eaſieſt paſſage. One current from it, for example, runs up by the ſouth of England, and another comes in by the north of Scotland: they take a conſiderable time to move all this way, and it is high-water ſooner in the places to which they firſt come; and it begins to fall at thoſe places, while the two currents are yet going on to others that are farther in their courſe. As they return, they are not able to raiſe a tide; becauſe the water runs faſter off than it returns, till, by a new tide propagated from the ocean, the return of the current is ſtopped, and the water begins to riſe again.

The tide takes twelve hours to come from the ocean to London-bridge, ſo that, when it is high-water there, a new tide is already come to its height in the ocean; and, in ſome intermediate place, it muſt be low-water at the ſame time. In channels, therefore, and narrow ſeas, the progreſs of the tides may be, in ſome reſpects, compared to the motion of the waves of the ſea.

Our author alſo obſerves, that when the tide runs over ſhoals, and flows upon flat ſhores, the water is raiſed to a greater height than in the open and deep oceans that have ſteep banks; becauſe the force of its motion cannot be broke, upon theſe level ſhores, till the water riſes to a greater height.

If a place communicates with two oceans (or two different ways with the ſame ocean, one of which is a readier and eaſier paſſage) two tides may arrive at that place in different times, which, interfering with each other, may produce a great variety of phænomena. An extraordinary inſtance of this kind is mentioned by our author at Bathſha, a port in the kingdom of Tunquin in the Eaſt-Indies, of northern latitude 20° 50′. The day in which the moon paſſes the equator, the water ſtagnates there without any motion: as the moon removes from the equator, the water begins to riſe and fall once a day; and it is high-water at the ſetting of the moon, and low-water at her riſing. This daily tide increaſes for about ſeven or eight days, and then decreaſes for as many days by the ſame degrees, till this motion ceaſes when the moon has returned to the equator. When ſhe has paſſed the equator, and declines towards the ſouth pole, the water riſes and falls again, as before; but it is high-water now at the riſing, and low-water at the ſetting, of the moon.

This theory of the tides has been extended ſo far, as to eſtimate the tides, or elevations of the waters of the moon, produced by the attraction of the earth: thus, let us ſuppoſe the quantity of matter (Q) in the earth to be to that in the moon (q) as 40 to 1; that is, $Q:q::40:1$; and let us firſt ſuppoſe the earth and moon of equal bulk, and repreſented by AIK (fig. 8.) and BDE, and the force (F) of the earth, at the ſurface of the moon B, will be to the force (f) of the moon, at the ſurface of the earth A, directly as the maſſes of matter in each (becauſe of the equal diſtances TB and LA) that is, $F:f::Q:q::40:1$. Again, let LB be to LC as the diameter of the earth to that of the moon, which is as 365 to 100, then will the force at B be to the force at C, as LB to LC, which let be as F to f, then $F:f::365:100$, whence $F=\frac{365f}{100}$; and above we have $F=40f$, therefore $4000f=365f$; and ſo $f:f::365:4000::1:11$, nearly; that is, the power of the earth to raiſe the water at the moon C, is to that of the moon at the earth A, as 11 to 1, very nearly.

If the moon can raiſe the water here 10 feet, the earth can raiſe the water there to the height of 100 feet; but becauſe the moon always turns about her axis in the ſame time as ſhe revolves about the earth, the waters (if any there be) will be raiſed on this and the oppoſite ſide, and always continue over the ſame part of the moon's ſurface, ſo that there can be no different heights of water there, and conſequently no tides, except what ſmall ones may happen on account of the ſun's attraction, and her various inequalities of motion, and diſtance from the earth.

The air, which is 860 times lighter than water, muſt yield in proportion more eaſily to the attracting force of the ſun and moon; and therefore the tides will, in this profound and vaſt aërial ocean, be very conſiderable and importing. See the articles ATMOSPHERE, HEAT, WIND, &c.

TIERCE, or TEIRCE, a meaſure of liquid things, as wine, oil, &c. containing the third part of a pipe, or forty-two gallons. See the article MEASURE.

TIGE, in architecture, a French term for the ſhaft or fuſt of a column, comprehended between the aſtragal and the capital. See the articles COLUMN and SHAFT.

TIGER, or TYGER, *Tigris*, in zoology, an animal belonging to the felis-kind, with an elongated tail, and variegated ſpots.

TILIA, the lime, or linden-tree, in botany, a genus whoſe flower conſiſts of five oblong blunt petals, crenated at the points; the filaments are awl-ſhaped, numerous, the length of the corolla, and topped with ſingle antheræ; the germen is roundiſh

roundiſh, the ſtyle ſlender and the length of the ſtamina, and the ſtigma is pentagonally obtuſe; the fruit is a globoſe coriaceous capſule, having five cells, and opens at the baſe with five valves, each cell containing a roundiſh ſeed.

The common lime-tree has a deep ſpreading root, that ſends forth a very large trunk, which produces ſo many branches as to render it very proper for ſhady walks; it is covered with a ſmooth bark, which is yellowiſh or whitiſh within, and is ſo tough and flexible, that, in ſome places, where better materials are ſcarce, they make cords or cables therewith: the leaves are broad, roundiſh, and terminate in a point; their edges are dentated, and their upper ſurface is generally covered with a honey dew, and the flowers grow in bunches.

This tree is of a very long duration, and often of a large magnitude; it naturally grows in a pyramidical form, and has a beautiful appearance; tho' of late years, it has not been held ſo much in eſteem as formerly, becauſe it is late in the ſpring before the leaves come out, and is the firſt which ſheds them, particularly when planted in a dry ſoil; the leaves frequently decay in July, and are continually falling off, making a litter all the remaining part of the ſummer.

Beſides this ſort, there are the ſmall-leaved lime-tree, the red-twigged lime-tree, the Carolina lime-tree, and the American black lime-tree; the three firſt ſorts are common in England, and are cultivated in moſt nurſeries; but the Carolina and American are not yet very common.

They are all eaſily propagated by layers, which in one year will take good root, and then may be taken off and planted in the nurſery, at about four feet diſtance row from row, and two feet aſunder in the rows. The time to lay them is in September, and autumn is the beſt ſeaſon for planting, though in moiſt lands the ſpring is as well.

The timber of the lime is uſed by carvers, it being a ſoft light wood; alſo by architects, for framing the models of their buildings: it is likewiſe uſed by turners for making light bowls, diſhes, &c.

The flowers of the lime-tree are ſaid to be good in all diſorders of the head, and may be drank in the manner of tea; and ſome make a conſerve of them for the ſame purpoſe: they are alſo reckoned good in the ſtone and gravel, and to diſſolve coagulated blood: the berries are aſtringent, and good againſt all hæmorrhages and looſeneſſes; the doſe in powder is a dram.

TILLÆA, in botany, a genus of plants, whoſe flower conſiſts of four ovate, acute, and plane petals, with four filaments, ſhorter than the corolla, and topped with ſmall antheræ: the fruit conſiſts of four oblong, acuminated, reflexed capſules, each containing two ovate ſeeds.

TILLANDSIA, in botany, a genus of plants, whoſe flower is monopetalous and tubulated; the tube is long and ventricoſe, and the limb is trifid; obtuſe, erect, and ſmall: the ſtamina are ſix filaments, terminated with acute antheræ, which lay down on the neck of the corolla: the fruit is a long acuminated capſule, obtuſely trigonal, and containing one cell, which incloſes ſeveral ſeeds affixed to a long capillary down.

This genus includes the caraguata and renealmia of Plumier.

TILLER, in huſbandry, denotes a young tree, left to grow till it be fellable for timber.

TILLER *of a Ship*, a ſtrong piece of wood faſtened in the head of the rudder, and in ſmall ſhips and boats called the helm.

TILLAGE, in huſbandry, is the opening, breaking, and dividing the ground with the ſpade, the plough, the hoe, or other like inſtrument.

TIMBER, includes all kinds of felled and ſeaſoned woods.

TIME, *Tempus*, a ſucceſſion of phænomena in the univerſe; or a mode of duration, marked by certain periods or meaſures, chiefly by the motion and revolution of the ſun.

The idea of time, in the general, Mr. Locke obſerves, we acquire by conſidering any part of the infinite duration as ſet out by periodical meaſures: the idea of any particular time, or length of duration, as a day, an hour, &c. we acquire firſt, by obſerving certain appearances at regular, and, ſeemingly, at equidiſtant periods.

Now, by being able to repeat thoſe lengths or meaſures of time, as often as we will, we can imagine duration, where nothing really endures or exiſts; and thus we imagine to-morrow, next year, &c.

Some of the latter ſchool-philoſophers define time to be the duration of a thing, whoſe exiſtence is neither without beginning nor end: by which time is diſtinguiſhed from eternity.

Time is diſtinguiſhed into abſolute and relative. Abſolute time, is time conſidered in itſelf, and without any relation to bodies, or their motions. This flows equally, i. e. never proceeds faſter or ſlower, but glides on in a conſtant, equable tenor. Relative time, is the ſenſible meaſure of any duration by means of motion. For ſince that equable flux of time does not affect our ſenſes, nor is any way immediately cognizable thereby, there is a neceſſity for calling in the help of ſome nearly equable motion to a ſenſible meaſure, whereby we may determine its quantity, by the correſpondency of the parts of this with thoſe of that.

Hence, as we judge thoſe times to be equal which paſs, while a moving body, proceeding with an equable velocity, paſſes over equal ſpaces; ſo we judge thoſe times to be equal which flow while the ſun, moon, and other lumimaries, perform their revolutions, which, to our ſenſes, are equal.

But ſince the flux of time cannot be accelerated, nor

nor retarded, (whereas all bodies move ſometimes faſter and ſometimes ſlower, and there is, perhaps, no perfectly-equable motion in all nature) it appears hence to follow, that abſolute time ſhould be ſomething truly and really diſtinct from motion. For let us ſuppoſe the heavens and ſtars to have remained without motion from the very creation, does it hence follow, that the courſe of time would have been at a ſtand? Or, rather, would not the duration of that quieſcent ſtate have been equal to the very time now elapſed?

Aſtronomical TIME, is that taken purely from the motion of the heavenly bodies without any other regard.

Civil TIME, is the former time accommodated to civil uſes, and formed and diſtinguiſhed into years, months, days, &c.

TIME, in muſic, is an affection of ſound, whereby we denominate it long or ſhort, with regard to its continuance in the ſame degree of time.

Common, or duple time, is of two ſpecies. 1. When every bar or meaſure is equal to a ſemi-breve, or its value, in any combination of notes of a leſſer quantity. 2. When every bar is equal to a minim, or its value, in leſſer notes.

TIN, *Stannum*, ♃, a well-known whitiſh metal, ſofter than ſilver, yet much harder than lead.

Tin is the lighteſt of all the metals; it is remarkable for a quality that no other of them has, which is, that when bent it makes a crackling noiſe. It is harder than lead, but leſs ſo than any other of the metals: it is malleable in a very remarkable degree, though leſs ſo than lead: it may eaſily be drawn into a courſe wire, but if this be attempted to be brought to any degree of fineneſs, it ſnaps and breaks under the workman's hands.

Tin is leſs ſuſceptible of ruſt than moſt of the other metals: it is very little elaſtic, and ſcarce at all ſonorous. It melts with a much ſmaller degree of fire than any other metal, a heat but a little greater than boiling-water being ſufficient to fuſe it. It melts before it grows red hot, like lead: and a degree of heat ſo much leſs even than that requiſite to the running of lead, is neceſſary to the fuſing of this metal, that it may be eaſily ſeparated from the other by aliquation; and if the fire be kept under a mixed maſs of the two, ſo low as to be juſt hot enough to melt the lead, the tin will all run off from it.

Tin amalgamates very readily with mercury, and may be mixed in fuſion with moſt other metals, and as readily ſeparated from them again by the beforementioned proceſs of eliquation. It is the leaſt ſimple of all the metals, being brought, by a very ſmall degree of fire, to emit ſulphureous fumes: theſe are plainly the abſolute ſulphur of the metal. They do injury to the people employed to work upon it, rendering them pale, and often abſolutely deſtroy them. The conſequence of the emitting theſe fumes ſo abundantly is, that tin, of all metals, loſes moſt of its weight, and calcines moſt eaſily in the fire. Expoſed to the focus of a great burning-glaſs, it immediately melts, and ſends off a large quantity of thick white fume; the remaining matter is then a fineery ſtalline or gloſſy matter, in form of needles; theſe, if held ever ſo long in the ſame heat, undergo no farther change, never running into a maſs of glaſs, as the remains of moſt of the metals do under the ſame circumſtances; but, like the glaſſes of the other metals, if expoſed again to the ſame heat, laid on a piece of charcoal, they immediately run into tin again; and the ſame thing happens if it be continued on the tile or coppel it was firſt placed on in the focus, and ſome fat matter, as tallow, or the like, to be added to it.

Filings of tin, thrown into the flame of a candle, take fire, and render the flame blue, emitting a viſible fume, and a ſmell of garlic: melted in a crucible, with a mixture of nitre, it deflagrates. Its conſtituent matters, therefore, ſeem to be a cryſtalline earth, which melts with great difficulty, and an inflammable ſulphur; in which, from its ſmell while calcining, and from its poiſonous quality, it it is probable there may be ſomething of arſenic mixed.

For the ſpecific gravity of pure tin, ſee the article GRAVITY.

Tin ſo far endures the force of lead and antimony in the refiner's teſt, that it is hardly to be ſeparated from them, unleſs by the addition of copper: it adheres to the reſt of the metals with greater eaſe than any other, and hence it is in continual uſe in covering plates of iron, and lining copper, and other metals, to prevent their ruſting, and to ſave the liquids put into them from taking up any bad qualities from thoſe metals, as it is much more difficultly ſolved by common menſtruums than either of them.

Tin, in many things, greatly approaches to the nature of ſilver. It very readily melts with ſilver, gold, or copper; when the mixture is made with equal, or even a leſs quantity, it renders them extremely brittle: but it is very ſingular, that if it be mixed in a much larger quantity, they ſtill continue pliant and flexile. Ten parts of tin and one of copper, make a maſs more rigid indeed than tin, yet malleable and ductile. Silver, of all metals, ſuffers moſt by an admixture of tin, a very ſmall quantity of it ſerving to make that metal as brittle as glaſs; and what is worſe, being very difficultly ſeparated from it again.

The addition of about one-tenth part of copper to tin, makes it fit for the common uſes of life, in veſſels of various kinds, as it becomes, by the mixture, more durable; a little zink, added to this mixture, gives the metal a yellow colour; and, as it is mixed in greater or leſs quantity, makes it fit for caſting of cannon and for bells.

Iron readily mixes with tin, in fuſion, if the fire be

be briſk, and the iron be heated white-hot before the tin be added. Twice the quantity of this metal, added to iron ſo heated, readily runs with it into an odd ſubſtance, which is very white and brittle, and readily anſwers to the magnet. This has been uſed by ſome, as a pretence of its not being iron, and that the load-ſtone would attract another metal beſide that: but the fallacy is eaſily diſcovered by any one that underſtands any thing of the metallurgic analyſis.

Lead bears a conſiderable admixture of tin, without being affected as gold and ſilver are, which are both rendered brittle by it; at leaſt, its effects on this metal are in a much ſmaller degree. The very vapour of tin has the ſame effect with the metal itſelf on ſilver, gold, and copper, rendering them brittle. Many a metallurgiſt has been long plagued by theſe vapours by a piece of tin being accidentally among his charcoal; the conſequence of which has been, that, till it was burned wholly away, theſe metals have been rendered as brittle as glaſs under the hammer, by only being fuſed over theſe coals.

It is owing to this property of tin, in making the metals it is mixed with brittle, that it renders them ſonorous. Mr. Boyle has expreſſed a wonder that tin, which is itſelf not much ſonorous, ſhould on mixture with copper render it more ſo; but if we conſider, that the ſame ſort of diſpoſition of parts which renders metals rigid and brittle, renders them ſonorous, the myſtery is explained.

The proper ſolvent of tin, in its true malleable ſtate, is aqua regia. It will not well diſſolve in any of the other menſtrua of the ſtronger kinds, nor indeed very readily in this. We are not, however, to wonder at this difficulty of ſolution in tin, ſince we find it contains much more ſulphur than any other metal, and ſulpher is not one of thoſe ſubſtances that are to be diſſolved by acids. That this is a fact, we find by putting calcined tin, inſtead of common malleable tin, into the menſtruum, for in this caſe even vinegar will diſſolve it. While tin is in its malleable ſtate, the weakeſt acids diſſolve it beſt. Verjuice, and, it is ſaid, even ſour apples, boiled in tin veſſels, acquire a taſte of that metal, though the ſtrongeſt acids (aqua-regia excepted) boiled in the ſame veſſels, acquire no flavour from it at all.

Many of the chemical writers have been of opinion, that, if the ſulphur could be thoroughly purged from tin, it would be no longer tin, but ſilver; it is certain that the two metals have many things in common. If diſſolved in aqua-regia, tin is bitter, as well as ſilver, in ſolution with the nitrous acid; but the cryſtals which are produced from a ſolution of it in vinegar, after it has been calcined for forty-eight hours together, which is a neceſſary ſtep towards ſuch a ſolution (and which one would think ſhould bring it nearer to ſilver than before, if the diſſipating its ſulphur were the way to do it) differ wholly from thoſe of ſilver. We have indeed accounts, in many authors, of tin being made to yield a large quantity of ſilver by peculiar proceſſes; but that careful experimenter, Mr. Boyle, tells us, that all tin is not to be expected to yield thoſe advantages in the ſame manner, for that himſelf had ſeparated pure cryſtals of ſilver from one parcel of tin by a peculiar menſtruum, but that another parcel of the ſame metal would not anſwer in the ſame manner.

Though tin and lead readily unite in fuſion over a gentle fire, if the heat be afterwards raiſed to a violent degree, there is a viſible motion excited in the mixture; and the conſequence is, that both are reduced to a calx, and the lead becomes extremely difficult afterwards to vitrify.

The effect that zink has upon a mixture of tin and copper (the copper being in a larger proportion than has been uſually given in ſuch mixtures) is little known, and ſeems to be a ſecret that the people who are poſſeſſed of it intend to make uſe of to themſelves.

The virtues of tin, as a medicine given internally, have been celebrated by many of the ancient writers, but it has leſs credit at preſent. We have been told, that in diſeaſes of the lungs, and in diſorders of the head and uterus, there is ſcarce any thing equal to it; and that in convulſions, epilepſies, and the madneſs ariſing from the bite of a mad dog, it was a certain remedy. Theſe laſt are the only caſes in which it has any credit at preſent, and that is rather among the vulgar than among phyſicians.

To theſe preparations uſed in medicine, we may add one well known as a coſmetic: it is a magiſtery of tin prepared in the manner of that of biſmuth, by firſt mixing ſix ounces of ſpirit of nitre with one ounce of ſpirit of ſea-ſalt, and then putting tin into this liquor, or aqua-regia, till it is capable of holding no more: laſtly, pour the ſolution into ſix or eight quarts of ſpring-water, and the tin will be precipitated in form of a white powder, which ſhould be waſhed ſeveral times, and then dried for the uſe of ladies in pomatums, to render the ſkin white and ſoft.

TINCTURE, *Tinctura*, in pharmacy and chemiſtry, a ſeparation of the finer and more volatile parts of a mixed body, made by means of a proper menſtruum diſſolving and retaining the ſame.

Rectified ſpirit of wine diſſolves the volatile oils and reſins of vegetables, whilſt water acts more immediately on their mucilaginous and ſaline matter. Hence, in whatever proportion the ſoluble parts of any vegetable are blended together, a ſpirit may be ſo adjuſted thereto by art, as entirely to diſſolve the whole, and conſequently to extract all the virtues of the ſubject, without any of the uſeleſs or woody parts. Fixed alkaline ſalts deepen the colour

four of ſpirituous tinctures, but add nothing to the diſſolving power of the menſtruum; nor is the addition of theſe ſalts uſeleſs only, but likewiſe prejudicial, as they injure the flavour of aromatics, and ſuperadd a quality ſometimes contrary to the intention of the medicine. Volatile alkaline ſalts, in many caſes, promote the action of the ſpirit; but acids, almoſt univerſally, weaken it. See ALKALI and ACID.

As to the method of extracting tinctures, the following general rules may be of uſe in this reſpect. 1. The vegetable ſubſtances ought to be moderately and newly dried, unleſs they are expreſly ordered otherwiſe; they ſhould likewiſe be cut and bruiſed before the menſtruum is poured on them. 2. If the digeſtion is performed in balneo, the whole ſucceſs depends upon a proper management of the fire: it ought to be all along gentle, unleſs the hard texture of the ſubject ſhould require it to be augmented; in which caſe the heat may be ſo increaſed as to make the menſtruum boil a little towards the end of the proceſs. 3. Very large circulatory veſſels ought to be employed for this purpoſe, which ſhould be heated before they are luted together. A commodious circulatory may be compoſed of two long-necked matraſſes or bolt-heads, the mouth of one of which is to be inſerted into that of the other, and the juncture ſecured by a piece of wet bladder. The uſe of heating the veſſels is, to expel a part of the air; which otherwiſe, rarifying in the proceſs, would endanger burſting them, or blowing off the uppermoſt matraſs. 4. The veſſel is to be frequently ſhaken during the digeſtion. 5. All tinctures ſhould be ſuffered to ſettle before they are committed either to the filter or ſtrainer. 6. In the tinctures, and diſtilled ſpirits likewiſe, deſigned for internal uſe, no other ſpirit, drawn from malt, melaſſes, or other fermented matter, is to be uſed, than that expreſly deſcribed.

Of tinctures there are various ſorts, and for various uſes; cephalic tinctures, antiſcorbutic tinctures, ſtomachic tinctures, anticolic tinctures, and invigorating tinctures; there are tinctures drawn from roſes, from cinnamon, and an infinite number of other ſubſtances, which it would be too tedious to mention.

TINCTURE, in heraldry, the hue or colour of any thing in coat armour, under which denomination may alſo be included the two metals, *or* and *argent*, becauſe they are often repreſented by yellow and white.

TIN-GLASS, a name given by ſome to a mineral matter more commonly called biſmuth. See the article BISMUTH.

TINGING *of Marble*. The art of doing this has, in ſeveral peoples hands, been a very lucrative ſecret, though there is ſcarce any thing in it that has not at one time or other been publiſhed. Kircher has the honour of being one of the firſt, who publiſhed any thing practicable about it. This author meeting with ſtones in ſome cabinets, ſuppoſed to be natural, but having figures too nice and particular, to be ſuppoſed of nature's making, and theſe not only on the ſurface, but ſunk through the whole body of the ſtones, was at the pains of finding out the artiſt, who did the buſineſs; and on his refuſing to part with the ſecret on any terms, this author, with Albert Gunter, a Saxon, endeavoured to find it out; in which they ſucceeded at length very well. The method is this: Take aqua fortis and aqua regia, of each two ounces; ſal armoniac, one ounce; ſpirit of wine, two drams; about twenty-ſix grains of gold, and two drams of pure ſilver; let the ſilver be calcined and put into a vial, and pour upon it the aqua-fortis; let this ſtand ſome time, then evaporate it, and the remainder will firſt appear of a blue, and afterwards of a black colour. Then put the gold into another vial, pour the aqua regia upon it, and when it is diſſolved, evaporate it as the former. Then put the ſpirit of wine upon the ſal armoniac, and let it be evaporated in the ſame manner. All the remainders, and many others made in the ſame manner from other materials, diſſolved in their proper acid menſtrua, are to be kept ſeparate, and uſed with a pencil on the marble. Theſe will penetrate without the leaſt aſſiſtance of heat; and the figure being traced with a pencil, the ſeveral parts are to be touched over with the proper colours, and this renewed daily till the colours have penetrated to the deſired depth into the ſtone. After this, the maſs may be cut into thin plates, and every one of them will have the figure exactly repreſented on both ſurfaces, the colours never ſpreading. The niceſt method of applying theſe, or the other tinging ſubſtances, to marble, that is to be wrought into any ornamental works, and where the back is not expoſed to view, is to apply the colours behind, and renew them ſo often till the figure is ſufficiently ſeen through the ſurface on the front, though it does not quite extend to it. This is the method that, of all others, brings the ſtone to a nearer reſemblance of natural veins of this kind.

TINNING, the covering or lining any thing with melted tin, or with tin reduced to a very fine leaf. Looking-glaſſes are foliated, or tinned, with thin plates of beaten tin, the whole bigneſs of the glaſs, applied or faſtened thereto by means of quick-ſilver.

The plumbers, on ſome occaſions, tin or whiten their ſheets of lead, in order to which they have a tinning-furnace, filled with live coal, at the ſides whereof two men are placed, who hold up the ſheets over the fire to heat; and the tin leaves being laid over them as faſt as the ſheets grow hot, and the tin melts, they ſpread it, and make it take by rubbing it with tow and roſin.

TINNATUS AURIUM, a noiſe or buzzing in the ear, when it receives ſounds which do not exiſt,

or at leaſt which are not produced by the motion of the external air; and the ear being filled with a certain ſpecies or ſound, cannot admit other ſounds, unleſs they are very violent. The tinnitus is of two kinds, the one proceeding from a diſtemperature of the organ of hearing, the other from a diſorder of the brain.

The cure, according to Heiſter, is to be performed by temperate diaphoretic powders, and reſolving eſſences, commonly called anticatarrhales; as of amber, the woods, roſemary, together with diaphoretics and alexipharmics, taken often in a day, with tea of betony, with roſemary flowers, ſage, or lavender, or ſaſſafras. In the morning, and at noon, the eſſences are to be taken, and at night the powders. Eſſence of amber may be applied outwardly, either alone or with a few drops of oil of amber, or one or two drops of oil of camomile put into the ear with cotton, morning and evening; or a grain or two of amber and muſk, or caſtor, in cotton, either alone or with Peruvian balſam; or carminative oils, ſuch as aniſe, fennel, carraways, or camomile; not neglecting pediluvia, and frequent rubbing of the feet and head. Many have alſo been cured by the vapour of a decoction of lavender flowers, or roſemary, made with wine, being conveyed to the ear with a funnel. If the diſeaſe is obſtinate and inveterate, the patient muſt bleed in the foot, together with ſcarifications, and frequent purges, for the ſake of revulſion. Etmuller ſays, this noiſe, proceeding from burning fevers, will go away of itſelf; but if it proceeds from chronic diſorders, it is difficult of cure. However, he recommends vapours of ſouthernwood, wormwood, origanum, eyebright, balm, &c. as alſo of amber, or gum ammoniac; likewiſe oil of peach kernels, and ſpirit of urine, put into the ear with cotton.

The following formula is greatly praiſed. White hellebore and caſtor, take of each two drachms; of coſtmary, one drachm and a half; of rue, two drachms; euphorbium, half a drachm; of bitter almonds, two drachms and a half: let them be boiled in oil of rue, and poured warm into the ear. Shaw recommends half an ounce of oil of bitter-almonds, with two drachms of oil of caſtor, externally applied.

TINUS, in botany, a genus of plants, whoſe flower corolla is monopetalous, quinquifid, and obtuſe, with an ovate, concave, pitcher-ſhaped nectarium, perforated at the mouth, and placed in the center of the receptacle; the ſtamina conſiſts of nine ſhort filaments, topped with heart-ſhaped antheræ: the fruit is a roundiſh, trilocular berry, containing three oblong ſeeds.

This genus comprehends the volkameria.

Tinus is alſo a name by which ſome call the Lauruſtinus. See the articles LAURUSTINUS and VIBURNUM.

TIPSTAFF, an officer who attends the judges with a kind of ſtaff tipt with ſilver, and takes into his charge all priſoners who are committed or turned over at a judge's chambers.

TIRE, or TEER *of Guns*, in the ſea-language, is a row of cannon placed along a ſhip's ſide, either above, upon deck, or below, diſtinguiſhed by the epithets of upper and lower tires.

TITANS, in the heathen mythology, the offſpring of Titan, the elder brother of Saturn, upon whom, and his ſon Jupiter, they made war, in order to recover the ſovereignty of which Titan had been deprived. The poets repreſent them as a race of giants, ſprung from the earth, and invading heaven; and tell us, that Jupiter overcame them with thunder, and drove them down to the very bottom of hell.

TITHES, *Decimæ*, in law, denote the tenth part of the increaſe that annually ariſes from the profits of lands, and the induſtry of the pariſhioners, which is payable for the maintenance of the parſon of the pariſh.

TITHING, in old law-books, the ſame with decennary. See DECENNARY.

TITHYMALUS, or TITHYMALOIDES, ſpurge, in botany, a genus of plants, whoſe flower is monopetalous, and contains ten filaments, inſerted in the receptacle, and topped with globular antheræ; the germen is roundiſh, three-cornered, and pedicellated, ſupporting three bifid ſtyles, crowned with oblong ſtigmata; the fruit is a roundiſh capſule, containing three cells, each incloſing an oval ſeed. This genus is included by Linnæus among the euphorbias.

All the kinds of ſpurge are full of a milky cauſtic juice, which is dangerous to take inwardly; it is by ſome outwardly applied to take off warts and hairs, but it ſhould be uſed very cautiouſly.

TITLE, *Titulus*, an appellation of dignity, or quality, given to princes, and other perſons of diſtinction.

TITLE, in law, denotes any right which a perſon has to the poſſeſſion of a thing; or an authentic inſtrument, whereby he can prove his right.

TITMOUSE, *Parus*, in ornithology, a genus of birds, of the order of the paſſeres, the beak of which is of a ſubulated form, and the point of the tongue truncated.

TITUBATION, or TREPIDATION, a kind of libration, or ſhaking, which the ancient aſtronomers attributed to the cryſtalline heavens, in order to account for certain irregularities which they obſerved in the motions of the planets.

TITULAR, denotes a perſon inveſted with a title, in virtue of which he holds an office or benefice, whether he perform the functions thereof or not.

TOAD, *Rubeta*, in zoology, belongs to the ſame

ſame genus with the common frog. See the article FROG.

The toad is larger than the frog, with a thick body, a broad back, and the belly ſwelled and inflated: its ſkin is conſiderably thick, and full of tubercles, of a duſky and blackiſh colour on the back, and ſpotted on the belly: it is naturally a lothſome and diſagreeble objects.

TOBACCO, *Nicotiana*, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is longer than the cup; and the limb, which ſpreads open, is divided into five acute-pointed ſegments; the ſtamina conſiſts of five ſubulated filaments, topped with oblong antheræ; the fruit is an oval capſule, with a furrow on both ſides, opening at the top in two cells, which contain a great many rough kidney-ſhaped ſeeds.

There are ſeveral ſpecies of tobacco; the flowers of ſome are leſs acute-pointed than others; they are all natives of America, and brought originally from thence, and at firſt were in great eſteem for their medicinal qualities.

It takes its Engliſh name of tobacco from the iſland of Tobago in the Weſt-Indies, from whence it was firſt brought by James Nicotius, a French gentleman, in the year 1560.

The deſcription of tobacco ſeems to be not neceſſary in this work, becauſe commerce, and its continual uſe, makes us ſufficiently acquainted with it. What is called the Oroonoko tobacco is raiſed here for the embelliſhment of the flower-garden; it is propagated by ſowing its ſeeds on a ſlight hot-bed in the ſpring, and the plants afterwards removed to where they are intended to remain.

In America, where ſuch large quantities are raiſed, they tranſplant them into a rich ſoil well prepared, taking care as the plants advance in growth to keep them clear of weeds, and to pull off the loweſt leaves, leaving ten or fifteen of the fineſt to receive all the nouriſhment; when theſe leaves are ripe, which is known by their breaking when bent, the ſtalks are then cut, and left to dry two or three hours in the ſun, after which they are tied together two and two, and hung on ropes under a ſhade to be dried in the air, which being ſufficiently done, the leaves are pulled from the ſtalks, and made up into little bundles; which being ſteeped in ſea-water, or, for want thereof, in common water, are twiſted in the manner of ropes, and the twiſts formed into rolls by winding them with a kind of mill around a ſtick; in which condition it is often imported into Europe, where it is cut by the tobacconiſts for ſmoaking, formed into ſnuff, and the like.

The taſte and ſmell of tobacco is well known, as likewiſe its effect upon the whole conſtitution at firſt uſe, when ſmoaked or chewed. If it be infuſed and the liquor drank, it produces ſickneſs, vomitting, and afterwards doſing ſtupidity; therefore, although it has been uſed as an emetic among ignorant people, common prudence will not juſtify the practice; experience manifeſts the narcotic properties of tobacco, whether it be only ſmoaked according to the cuſtom of many, or chewed, as ſome take it, or adminiſtered in ſnuff, it has always the ſame effect; but upon long practice, like many other things of this kind, it grows leſs perceivable in ſuch qualities, and with ſome ſeems to have no influence at all; but it is ſomewhat ſurpriſing to think what a voluntary puniſhment people lay on themſelves to learn a bad habit, merely becauſe they would follow an unnatural cuſtom, which ſmoaking, chewing, and ſnuffing tobacco certainly is.

As a ripener or drawer, its heat and penetration gives a diſpoſition to the incloſed humours to ripen; it alſo quiets and ſooths the parts with its narcotic qualities, whereby the irritation is prevented; upon this account it is frequently of great ſervice where there are ſharp pains attended with a tumour, and particularly in thoſe of the gout and rheumatiſm; the leaf bound upon the part is the beſt way of applying it, eſpecially if it be rubbed over firſt with a little oil.

But notwithſtanding what has been ſaid againſt the cuſtom of ſmoaking, &c. the uſe of tobacco may be commended in the time of the plague, and other infectious diſeaſes.

TOD *of Wool*, a quantity containing twenty-eight pounds, or two ſtone.

TOES, called by anatomiſts *digiti pedis*, are the extreme diviſions of the feet, anſwering to the fingers of the hands.

The bones of the toes of both feet are twenty-ſix in number, ſometimes twenty-eight; being much ſlenderer, except that of the great toe, than thoſe of the fingers: they have alſo a much leſs free motion than thoſe of the fingers: the great toe has only two bones, and the reſt three; except the little toe in very old people, in whom the two phalanges of the little toe grow together ſo as to form only one bone; whence we find, in this caſe, fewer bones in each foot than thirteen.

In caſe of adheſions of the toes of infants, they ſhould be ſeparated either by cutting out the intermediate ſkin with a pair of ſciſſars, or barely by dividing them with the ſame inſtrument: and when this is done, in order to prevent their cohering again, they ſhould be wrapped up in a ſpiral bandage, dipped in lime-water and ſpirit of wine.

TOFT, in law-books, denotes a parcel of land, or a place where a meſſuage has formerly ſtood.

TOGA, in Roman antiquity, a wide woollen gown, or mantle; which ſeems to have been of a ſemi-circular form, without ſleeves; differing both in richneſs and largeneſs, according to the circumſtances of the wearer, and uſed only upon occaſion of appearing in public.

TOILS, ſnares or nets uſed by hunters for catching wild beaſts, as deer, &c.

TOILET, a fine cloth of linen, ſilk, or tapeſtry, ſpread over the table in a bed-chamber or dreſſing-room, to undreſs and dreſs upon.

TOISE, a French meaſure containing ſix of their feet, or a fathom.

TOLERATION, in matters of religion, is either civil or eccleſiaſtical. Civil toleration, is an impunity and ſafety granted by the ſtate to every ſect that does not maintain doctrines inconſiſtent with the public peace: and eccleſiaſtical toleration, is the allowance which the church grants to its members to differ in certain opinions, not reputed fundamentals.

TOLL, in law, a tax or cuſtom paid for paſſage, or for the liberty of ſelling goods in a market or fair. Hence, toll booth is a place in a town, where goods are weighed, in order to aſcertain the duties thereon.

TOLUIFERA, in botany, a large tree which grows naturally in the Spaniſh Weſt-Indies; the bark is very thick, rough, and of a brown colour; the branches ſpread out wide on every ſide, and are furniſhed with winged leaves, compoſed of ſeveral oblong oval folioles placed alternately, and terminated with an odd one; theſe are ſmooth, of a light-green colour, and ſit cloſe to the footſtalk. The flowers are produced in ſmall bunches at the wings of the branches, each ſtanding upon a ſlender footſtalk. The flower conſiſts of five petals of a yellow colour, inſerted in the receptacle, four of which are narrow and equal, and a little longer than the cup, the fifth is much larger, and almoſt heart-ſhaped, and has an ungue the length of the cup; the ſtamina are ten ſhort filaments, topped with oblong erect antheræ; the fruit is roundiſh, the ſize of a large pea, divided into four cells, each containing an oblong oval ſeed.

This tree produces the balſam of Tolu. See the article BALSAM.

TOMAN, or TOUMAN, a kind of imaginary money uſed among the Perſians in the keeping of their books, and to facilitate the reduction of money in the payment of conſiderable ſums. See the article MONEY.

TOMB, includes both the grave or ſepulchre wherein a defunct is interred, and the monument erected to preſerve his memory.

TOME, in matters of literature, denotes a bound book, or writing that juſt makes a volume.

TOMENTUM, among botaniſts, the downy matter which grows on the leaves of ſome plants.

TONE, or TUNE, in muſic, a property of ſound, whereby it comes under the relation of grave and acute; or it is the degree of elevation any ſound has from the degree of ſwiftneſs of the vibrations of the parts of ſonorous bodies.

TONGUE, *Lingua*, in anatomy, the primary organ of taſte and ſpeech; the figure of which approaches, in ſome degree, to pyramidal; its anterior part being called apex, and its poſterior part the baſe or root. The upper ſide is not quite flat, but a little convex, and divided into two lateral halves, by a ſhallow depreſſed line called linea linguæ mediana. The edges are thinner than the other parts, and a little rounded as well as the point. The lower ſide reaches only from the middle of the length of the tongue to the point.

The tongue is principally compoſed of very ſoft fleſhy fibres, intermixed with a peculiar medullary ſubſtance, and diſpoſed in various manners. Many of theſe fibres are confined to the tongue without going any farther; the reſt form ſeparate muſcles which go out from it in different ways, and are inſerted in other parts: all the upper ſide of the tongue is covered by a thick membrane of a papillary texture, upon which lies another very fine membrane like a kind of epidermis, which is likewiſe continued over the loweſt ſide, but without papillæ.

Three ſorts of papillæ may be diſtinguiſhed in the upper ſide of the tongue, capitatæ, ſemi-lenticularis, and villoſæ. Thoſe of the firſt kind are the largeſt, reſembling little muſhrooms with ſhort ſtems, or buttons without a neck: they lie on the baſis of the tongue, in ſmall ſuperficial foſſulæ. They reſemble ſmall conglomerate glands, ſeated on a very narrow baſis, and each of them has ſometimes a ſmall depreſſion in the middle of their upper convex ſide: they occupy the whole ſurface of the baſis of the tongue, and are ſituated near each other, in ſuch a manner as that the moſt anterior form an angle; they are glandular papillæ, or ſmall ſalival or mucilaginous glands, of the ſame kind with thoſe that are to be deſcribed hereafter.

We often obſerve, about the middle of this part of the tongue, a particular hole of different depths: the inner ſurface of which is entirely glandular, and filled with ſmall papillæ like thoſe of the firſt kind. It is called foramen cæcum Morgagnii, as being firſt deſcribed by that author; ſince that time Vaterus has diſcovered a kind of ſalival ducts belonging to it; and Heiſter found two of theſe ducts very diſtinctly, the orifices of which were in the bottom of the foramen cæcum, near each other. He obſerved the ducts to run backward, divaricating a little from each other; and that one of them terminated in a ſmall oblong veſicle, ſituated on the ſide of the ſmall cornu of the os hyoides.

The papillæ of the ſecond kind, or ſemilenticulares, are ſmall orbicular eminences, only a little convex, their circular edge not being ſeparate from the ſurface of the tongue. When we examine them in a ſound tongue with a good microſcope, we find their convex ſides full of ſmall holes or pores, like the end of a thimble.

They lie chiefly in the middle and anterior portions of the tongue, and are ſometimes moſt viſible on the edges, where they appear to be very ſmooth and poliſhed, even to the naked eye, and ſometimes in

in living ſubjects. They ſoon loſe their conſiſtence after death, ſo that, by rubbing them ſeveral times, they may be drawn out in form of ſmall ſoft pyramids, inclined to one ſide. The papillæ of the third kind, or villoſæ, are the ſmalleſt and moſt numerous. They fill the whole ſurface of the upper ſide of the tongue, and even the interſtices between the other papillæ. They would be more properly named papillæ conicæ, than villoſæ, from the figure which they appear to have, when examined through a microſcope. They are naturally ſoftiſh, but become extremely flaccid after death; ſo that by handling them they may be made ſhort and thick, whereas they are naturally long and ſmall.

The fleſhy fibres of which the tongue is compoſed, and which go no further than the tongue, may be termed muſculi linguæ interiores, or the intrinſic muſcles; and they are the ſame with what Spigelius named muſculi linguales. The fibres theſe muſcles conſiſt of are of three general kinds, longitudinal, tranſverſe, and vertical; and each of theſe ſituations admits of different degrees of obliquity. The longitudinal fibres point to the baſis and apex of the tongue, and ſeem partly to be expanſions of the muſculi ſtylogloſſi, hyo-gloſſi, and genio-gloſſi. The vertical fibres ſeem likewiſe to be in part produced by the ſame genio-gloſſi, and the tranſverſe by the mylo-gloſſi.

Beſides theſe mixed productions, there is a diſtinct plane of longitudinal fibres, which run near the ſurface of the upper ſide of the tongue, and a diſtinct tranſverſe plane under them. All theſe fibres are partly interwoven, one portion of them terminating at the two edges of the tongue, and the other at the baſis and point, without going to any other part; and they lie immediately above thoſe which belong to the genio-gloſſi. To diſcover all theſe different fibres, and their different degrees of direction, we need only cut the tongue longitudinally, after it has been boiled, or long macerated in ſtrong vinegar. The extrinſic muſcles, or muſculi exteriores, are thoſe which by one extremity make a part of the body of the tongue, and are fixed by the other in ſome part without the tongue. Of theſe we reckon four pair, mylo-gloſſi, ſtylo-gloſſi, hyo-gloſſi, and genio-gloſſi.

TONGUE-TIED, the popular name for a diſtemper of the tongue in children, when it is tied down too cloſe to the bottom of the mouth, by a ligament connected all along its middle, and called its frænulum, which requires to be divided, to give the tongue its proper motion.

This is ſometimes the caſe in adults, but oftener in children, who cannot then exert their tongues to ſuck. This is, however, by no means ſo common as the women uſually imagine; not ſo much as one child in a thouſand being afflicted with it; nor is the operation in cutting it of little conſequence, ſince often bad accidents follow it, and ſometimes the loſs of the child's life.

When the infant can put its tongue out of its mouth, the frænulum wants no inciſion; but when the tongue cannot be extended beyond the teeth, the operation is neceſſary. To perform this, the end of the tongue ſhould be covered with a linen rag, and held with the fingers to prevent its ſlipping, and the ligament of the tongue running between the ranular veins and internal ſalival ducts, is to be divided by a pair of obtuſe-pointed ſciſſars, till it give room enough for ſucking or ſpeaking: but in doing this, great care muſt be taken not to wound the ſalival ducts, or the proper veins and arteries of the tongue; for children have been known to periſh upon the ſpot, from the cutting the ranular veins in this operation. Midwives often tear this ligament with their fingers, as ſoon as the child is born; but this is a dangerous and bad practice.

TONIC, τονικος, in medicine, is applied to a certain motion of the muſcles wherein the fibres, being extended, continue their extenſions in ſuch a manner, as that the part ſeems immoveable, though in reality it be in motion.

TONNAGE, or TUNNAGE. See the article TUNNAGE.

TONSILS, *Tonſillæ*, in anatomy, two remarkable glands, ſituated one on each ſide of the mouth, near the uvula, and commonly called almonds of the ears, from their reſembling almonds in figure.

Their uſe is to ſecrete a mucous humour, for lubricating the paſſages: this they diſcharge by ſeveral irregular but conſpicuous foraminæ into the mouth.

TONSURE, in eccleſiaſtical hiſtory, a particular manner of ſhaving or clipping the hair of eccleſiaſtics, or monks.

TOOL, among mechanics, denotes in general any ſmall inſtrument, uſed as well for making other more complex inſtruments and machines, as in moſt operations in the mechanic arts.

TOOTH, *Dens*, in anatomy, a little, very hard, and ſmooth bone, fixed in a proper alveolous or ſocket in the jaw, in the manner of a nail; and ſerving to maſticate or chew the food.

The natural colour of the teeth, in mankind, is white; and their number, from twenty-eight to thirty-two; fourteen, fifteen, or ſixteen, being placed in each jaw, if the number be perfect. The teeth are uſually divided into the four inciſores, or fore-teeth; the two canine, eye-teeth, or dog-teeth; the eight molares, or grinders, in each jaw, and two dentes ſapientiæ.

The bodies of the teeth are compoſed of a double ſubſtance, a ſtony or porcelain-like matter, and a medullary one: their roots are ſometimes ſimple, as in the inciſores, canini, and foremoſt of the molares; and ſometimes double, triple, or quadruple, as in the hinder molares.

The

The cavities of the teeth are covered with a vasculo-nervous membrane, and the foraminula, or little holes, in the ends of them, serve for the ingress of the vessels which afford them nutrition and sensation.

For the breeding of the teeth, in infants, see the article DENTITION.

As to the cleansing of foul teeth, see the article DENTIFRICE.

Fossile teeth of fishes are known by three names; the glossopetræ, the bufonitæ, and the plectronitæ. See the articles GLOSSOPETRÆ, BUFONITÆ, and PLECTRONITÆ.

TOOTH-ACH, *ὀδονταλγια*, a very painful disorder, caused by an impure serum which corrodes and rends the ligaments and nervo-glandulous coats, by which the teeth are kept firm in their sockets: its seat may also be in the cavity or internal parts of the teeth themselves.

The whole intension of cure, in this disorder, consists in deriving and diverting the impure scorbutic serum from the head, and then carrying it off by proper emunctories. This is to be done by saline, emollient, and purgative clysters; by warm pedeluvia of rain-water and wheat-bran, with Venice-soap, used just before bed-time; by laxatives of manna and cassia dissolved in whey or asses-milk, or mineral waters: if the patient is plethoric, or full of blood, phlebotomy in the foot will be proper, to derive the humours from the head. Sudorific remedies are also proper, but more especially an electuary made of rob of elder-berries, burnt hart's-horn, diaphoretic antimony, and a few grains of nitre: or, an ounce of the rob may be taken in broth, to promote a diaphoresies; and it may be used externally, dissolved in beer, in the manner of a gargle, which will yield immediate relief to the patient.

When the patient is subject to catarrhs, is scorbutic or cachectic, then mineral waters are most proper; and if the patient is of a weak bilious constitution, the water should be mixed with asses-milk.

Outwardly, may be applied bags, filled with paregoric and emollient species; such as elder, melilot, and camomile flowers, bay and juniper-berries, carraway and millet-seeds, and decrepitated salt: they must be laid on warm, and are very safe. A drop or two of oil of cloves or box, applied to a carious tooth with cotton, are medicines not to be despised; and camphorated spirits of wine, mixed with saffron, castor, and opium, made into a liniment, and laid to the gums and hollow tooth, often gives the patient ease.

When the tooth-ach proceeds from a rotten hollow tooth, it will be best to burn the little nervous cord, which is the seat of the pain, with an acute cautery; and then the cavity may be filled up with a mixture of wax and mastich. But if this cannot be done, the only remedy left is to have the tooth drawn.

Allen advises, to rub the tooth that is painful, with the root of the iris lutea, or the yellow fleur-de-luce; or a pill may be made of equal quantities of camphor or opium, and put into the hollow tooth; and, lastly, some greatly recommend a small plaster of tacamalhac, laid on the side of the face.

TOPARCHY, a little state or seigniory, consisting only of a few cities or towns; or a petty country, governed and possessed by a toparch, or lord. See GOVERNMENT.

TOPAZ, in natural history, a gem called by the ancients chrysolite, as being of a gold-colour. See GEM.

The topaz, when perfect and free from blemishes, is a very beautiful and valuable gem; it is, however, very rare in this state. It is of the number of those gems which are found only in the round or pebble form, there never having been yet seen a true and genuine topaz of a columnar figure, though the far greater part of what our jewellers call such, are in that form.

The greatest part of the true topazes are no larger than grains of a coarse seed; among these there are, however, some met with of the size of a pea, and some much larger, though those are very rare.

It is of a roundish or oblong figure in its native or rough state, and usually is flatted on one side, and is generally of a bright and naturally polished surface, tolerably transparent. They are ever of a fine yellow colour; but they have this, like the other gems, in several different degrees; the finest of all are of a true and perfect gold-colour, but there are some much deeper, and others extremely pale, so as to appear scarce tinged. The original topaz is equal to the ruby in hardness, and is second only to the diamond in lustre. The topazes of the other parts of the world fall off greatly from this hardness, but the purest of the genuine ones are considerably harder than crystal.

The topaz, on being thrown into a charcoal fire, entirely loses its colour, and when taken out, is a very fine colourless stone, undistinguishable from that known by the name of the white sapphire: upon the whole, it appears, that the oriental coloured gems are all much alike in their matter, differing scarce at all, except in colour, and that when they are found either naturally colourless, or rendered so by art, it is not easy to distinguish one of them from the other.

The finest topazes in the world are found in the East-Indies, but they are very rare there of any great size: the great mogul, however, at this time, possesses one, which is said to weigh a hundred and fifty-seven carats, and to be worth more than twenty thousand pounds. The topazes of Peru come next, after these, in beauty and in value. The European

European are principally found in Silesia and Bohemia, and are generally full of cracks and flaws, and of a browniſh yellow.

TOPHUS, in medicine, denotes a chalky or ſtony concretion in any part of the body, as the bladder, kidneys, &c. but eſpecially in the joints. See GOUT.

TOPIC, in rhetoric, denotes a probable argument, drawn from the ſeveral circumſtances of a fact, &c.

TOPICS, or TOPICAL MEDICINES, are the ſame with external ones, or thoſe applied outwardly to ſome diſeaſed and painful part: ſuch are plaſters, cataplaſms, unguents, &c. See the articles PLASTER, &c.

TOPOGRAPHY, a deſcription or draught of ſome particular place, or ſmall tract of land, as that of a city or town, manor or tenement, field, garden, houſe, caſtle, or the like; ſuch as ſurveyors ſet out in their plots, or make draughts of, for the information and ſatisfaction of the proprietors.

TORCH-THISTLE, *Cereus*, or *Cactus*, in botany. See CEREUS.

TORDYLIUM, hart-wort, in botany, a genus of umbelliferous plants, whoſe general corolla is difform and radiated; the particular flowers of the diſc conſiſt each of five inflexed heart-ſhaped petals, which are equal; thoſe which form the radius are like the others, except the outward petals, which are largeſt and bipartite: the fruit is roundiſh and compreſſed, longitudinally indented, dividing into two parts, each containing a roundiſh compreſſed ſeed, with an indented margin.

The roots of the common hart-wort are accounted good in a moiſt aſthma, and to promote expectoration; but it is very little uſed in the preſent practice.

TORE, *Torus*, in architecture, a large round moulding, uſed in the baſes of columns. See the article MOULDING.

TORENIA, in botany, a genus of didynamious plants, whoſe flower is monopetalous and ringent; the upper lip is intire, and the lower one trifid, with the middle ſegment drawn out in length; the germen is oblong, the ſtyle ſlender, and crowned with a bifid acute ſtigma: the fruit is an oblong bilocular capſule, which contains many ſeeds.

TOREUMATOGRAPHY, a Greek term, ſignifying the knowledge, or rather deſcription, of ancient ſculptures and baſſo-relievos.

TOREUTICE, τορευτικη, that part of ſculpture otherwiſe called turning. See the article TURNING.

TORIES, or TORYS, in the hiſtory of England, a faction, or party, oppoſed to the whigs.

The tories are great ſticklers for the prerogative of the crown, as the whigs are for the liberties and privileges of the people: though, in truth, the principles of the moderate people of both parties do not greatly differ. See the article WHIGS.

TORMENTIL, *Tormentilla*, in botany, a genus of plants, whoſe flower hath four oval, heart-ſhaped, patent petals, with their ungues inſerted into the cup: the ſtamina conſiſt of ſixteen ſubulated filaments, half the length of the corolla, inſerted into the cup, and topped with ſingle antheræ: the germina are eight in number, collected into a head, which afterwards become ſo many oblong obtuſely-acuminated ſeeds, and contained in the cup.

The common tormentil has a root about the thickneſs of a man's finger; it is rough, unequal, ſometimes ſtraight, and ſometimes crooked, of a dark colour without, and reddiſh within: the ſtalks are ſlender, weak, hairy, and reddiſh, about a foot long, and ſurrounded with leaves by intervals, which are hairy. It grows in dry paſtures and commons in moſt parts of England, and flowers in May, June, or July.

The root has been frequently uſed for tanning of leather, in places where oak bark is ſcarce: it has an auſtere ſtyptic taſte, accompanied with an aromatic flavour, and is one of the moſt agreeable and efficacious aſtringents in the whole vegetable kingdom: there are alſo a tincture and a diſtilled water of it, the former of which poſſeſſes all the virtues of the ſimple.

TORMINA, the gripes, in medicine. See the article COLIC.

TORNADO, or TURNADO, a ſudden and vehement guſt of wind from all points of the compaſs, frequent on the coaſt of Guinea. See the articles HURRICANE and WHIRLWIND.

TORPEDO, the cramp or numb fiſh, in ichthyology, a ſpecies of raia, the body of which is perfectly ſmooth, and conſiderably broad in proportion to its length; the roſtrum, or ſnout, is oblong and ſubacute; the back is ſomewhat gibboſe; the belly is flat, and the ſides are terminated by broad fins; its colour on the back is a duſky greyiſh, and the belly is white.

The moſt ſingular property of this fiſh is, that, when out of the water, it affects the hand or other part that touches it, with a ſenſation much like that which we call the cramp; the ſhock is inſtantaneous, and reſembles that given by electricity, only that the effect laſts longer: this is all the fiſh can do; but thoſe who have related it, have raiſed the effects almoſt into miracles. Reaumur has given a long memoir, wherein he endeavours to account for this ſingular phænomenon, which he reſolves into the inſtantaneous action of a vaſt multitude of ſmall muſcles on the ſurface of the body of the fiſh: but there ſeems ſomething more required, in order to the perfectly explaining ſo odd an effect.

TORQUE, in heraldry, denotes a round roll of cloth, twiſted and ſtuffed; ſuch is the bandage, frequently

quently ſeen in armories, about the heads of Moors, &c. It is always of the two principal colours of the coat; and is accounted the leaſt honourable decoration worn on the helmet, by way of creſt.

TORREFACTION, in chemiſtry, is the roaſting or ſcorching of a body by the fire, in order to diſcharge a part either unneceſſary or hurtful in another operation; as ſulphur is thus diſcharged from an ore, before the metal can be obtained to advantage.

TORRENT, *Torrens*, in geography, denotes a temporary ſtream of water, falling ſuddenly from mountains, whereon there have been great rains, or an extraordinary thaw of ſnow.

TORRICELLIAN EXPERIMENT, a famous experiment made by Torricelli, a diſciple of the great Gallileo, which has been already explained under the article BAROMETER; which ſee.

TORRID ZONE, among geographers, denotes that tract of the earth lying upon the equator, and on each ſide as far as the two tropics, or 23° 30′ of north and ſouth latitude.

The torrid zone was believed, by the ancients, to be uninhabitable; but is now well known to be not only inhabited by the natives of thoſe hot climates, but even tolerable to the people of the colder climates, towards the north and ſouth; the exceſſive heat of the day being there tempered by the coldneſs of the night.

TORTOISE, *Teſtudo*, in zoology. See the article TESTUDO.

TORTURE, a grievous pain inflicted on a criminal, or perſon accuſed, to make him confeſs the truth.

TOUCAN, in ornithology, a ſpecies of ramphaſtos, of a middle ſize between our common magpie and the thruſh, but having a beak thicker and longer than its whole body: this beak is hooked at the end, and is of a very thin ſubſtance, not exceeding the thickneſs of a membrane, and very light and hollow, yet bony in ſubſtance, and very bright and ſhining. It has a ſort of toothed edge, which prevents its ſhutting cloſely, and, giving paſſage for the air, enables the bird to live without noſtrils. It is yellowiſh on the outſide and red within, and is covered with a ſort of ſcaly ſubſtance, eaſily ſcraped off with the finger at the edge.

The head of this bird is large in proportion to its body, and is black on the crown; the reſt of it, and the neck and back, are ſlightly variegated with white; its breaſt is of a bright orange colour, its belly and thighs of a very fine and bright red, and the tail is black, but red at the end.

TOUCAN, in aſtronomy, a conſtellation of the ſouthern hemiſphere, conſiſting of eight ſmall ſtars, and otherwiſe called Anſer Americanus.

TOUCH-NEEDLE, among aſſayers, refiners, &c. little bars of gold, ſilver, and copper, combined together in all the different proportions and degrees of mixture; the uſe of which is to diſcover the degree of purity of any piece of gold or ſilver, by comparing the mark it leaves on the touch-ſtone, with thoſe of the bars.

The metals uſually tried by the touch-ſtone, are gold, ſilver, and copper, either pure, or mixed with one another in different degrees and proportions, by fuſion.

In order to find out the purity or quantity of baſer metal in theſe various admixtures, when they are to be examined, they are compared with theſe needles, which are mixed in a known proportion, and prepared for this uſe. The metals of theſe needles, both pure and mixed, are all made into laminæ, or plates, one-twelfth of an inch broad, and of a fourth part of their breadth in thickneſs, and an inch and half long; theſe being thus prepared, you are to engrave on each a mark indicating its purity, or the nature and quantity of the admixture in it.

The black rough marbles, the baſaltes, or the ſofter kinds of black pebbles, are the moſt proper for touch-ſtones.

Now, the method of uſing the needles and ſtone is this: The piece of metal to be tried, ought firſt to be wiped well with a clean towel, or piece of ſoft leather, that they may the better ſee its true colour; for from this alone an experienced perſon will, in ſome degree, judge before-hand what the principal metal is, and how, and with what, debaſed.

Then chuſe a convenient, not over large, part of the ſurface of the metal, and rub it ſeveral times very hardly and ſtrongly againſt the touch-ſtone, that in caſe a deceitful coat or cruſt ſhould have been laid upon it, it may be worn off by that friction; this, however, is more readily done by a grind-ſtone, or ſmall file, if you have them at hand. Then wipe a flat and very clean part of the touch-ſtone, and rub againſt it, over and over, the juſt mentioned part of the ſurface of the piece of metal, till you have, on the flat ſurface of the ſtone, a thin metallic cruſt, an inch long, and about an eighth of an inch broad: this done, look out the needle that ſeems moſt like to the metal under trial, wipe the lower part of this needle very clean, and then rub it againſt the touch-ſtone, as you did the metal, by the ſide of the other line, and in a direction parallel to it.

When this is done, if you find no difference between the colours of the two marks, made by your needle and the metal under trial, you may with great probability pronounce that metal and your needle to be of the ſame alloy, which is immediately known by the mark engraved on your needle. But if you find a difference between the colour of the mark given by the metal, and that by the needle you have tried, chooſe out another needle, either of a darker or lighter colour than the former, as the difference of the tinge on the touch-ſtone directs; and

and by one or more trials of this kind you will be able to determine which of your needles the metal anſwers, and thence what alloy it is of, by the mark of the needle; or elſe you will find that the alloy is extraordinary, and not to be determined by the compariſon of your needles.

TOUR, a French term, frequently uſed for a journey or progreſs through one or more countries.

TOURNEFORTIA, in botany, a genus of plants, whoſe flower-cup is ſmall, and divided into five ſegments; the corolla is monopetalous and funnel-ſhaped, the tube of which is cylindric and globular at the baſe, and the limb is divided into five acute ſegments, which ſpread open horizontally: the fruit is a globoſe ſucculent berry, containing four oblong oval ſeeds, ſeparated by the pulp.

This genus is the ſame with the pittonia of Plumier.

TOURNEQUET, in ſurgery, an inſtrument made of rollers, compreſſes, ſcrews, &c. for compreſſing any wounded part, ſo as to ſtop hæmorrhages.

The common tournequet is very ſimple, conſiſting only of a roller, which, with the help of a ſmall ſtick, ſerves to ſtop the effuſion of blood from large arteries, in amputations, by forcibly tying up the limb. The things neceſſary for this are a roller, of a thumb's breadth, and of an ell in length, a ſmall cylindrical ſtick, a conglomerated bandage, two fingers thick and four long, ſome compreſſes of a good length and about three or four fingers breadth, to ſurround the legs and arms, and a ſquare piece of ſtrong paper or leather, about four fingers wide.

TOWER, *Turris*, a tall building, conſiſting of ſeveral ſtories, uſually of a round form, though ſometimes ſquare or polygonal.

TOWN, a place inhabited by a conſiderable number of people, being of a middle ſize between a city and a village.

TOXICODENDRON, the poiſon-tree, in botany, a genus producing male and female flowers on different plants; the male flowers have five ſmall roundiſh petals, which ſpread open, with the ſame number of ſtamina; the female flower is like the male, excepting the deficiency of the ſtamina, inſtead of which, it contains three ſmall ſtyles, crowned with globular ſtigmata; and the fruit is a ſmooth ſtriated berry, containing a compreſſed furrowed kernel or ſeed.

This genus is included by Linnæus among the ſumachs. See the article RHUS.

There are ſeveral ſpecies of toxicodendron; the wood of ſome of them, when burnt, emits a noxious fume, which will ſuffocate animals when they are ſhut up in a room where it is burning; the ſcent of it, when cut down in the woods, has poiſoned many people, and ſeveral, with only handling it, have been made blind for ſeveral days. The juice of the tree is milky when it firſt iſſues out of the wounded part, but ſoon after it is expoſed to the air it turns black, and has a very ſtrong fœtid ſcent, and will even corrode iron.

TOZZIA, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is cylindraceous, and longer than the cup; the limb is patent; the upper-lip bifid, and the lower one trifid, and all the edges are almoſt equal and roundiſh: the fruit is a globoſe unilocular capſule, containing a ſingle egg-ſhaped ſeed.

TRACHEA, in anatomy, called alſo aſpera arteria, and in Engliſh the wind-pipe, is a tube or canal, extended from the mouth to the lungs; its ſituation is in the middle and anterior part of the neck; and it is connected with the fauces, the lungs, and the œſophagus. Anatomiſts commonly divide it into two parts, the larynx, and aſpera arteria properly ſo called. See the article LARYNX.

The trachea, or aſpera arteria properly ſo called, is that whole cartilaginous canal, extended from the larynx, which is only its mouth or entrance, to the bronchia or lungs; being, in ſome meaſure, of a conic figure. Its beginning is cylindrical, and capable of admitting a finger; and its other end is ſomewhat narrower. It enters the thorax under the ſternum, and is there divided into two branches, before it enters the lungs: it is compoſed of eighteen or nineteen, ſometimes but ſixteen, ſometimes twenty, cartilaginous rings, and four coats. Theſe rings are imperfect, the hinder part of the trachea being membranaceous. Of the four coats, the exterior is membranaceous, the ſecond glandulous, the third muſcular, and the fourth or internal covering is tendinous and robuſt.

The uſes of the trachea are, to aſſiſt in deglutition, and to be aſſiſtant to the lungs: on the exterior part of it are the thyroide and bronchial glands, which ſecrete an humour to moiſten it: its arteries are from the external carotids, the veins from the jugulars, and the nerves from the recurrent ones of the plexus cervicalis.

The tracheæ of vegetables are certain air-veſſels, diſcernible in many plants, but in none more diſtinctly than the melon.

TRACHELIUM, umbelliferous throat-wort, in botany, a genus of plants, whoſe flower is monopetalous and funnel-ſhaped; the tube is very long, ſlender, and cylindric; the limb is ſmall, and divided into five ovate concave ſegments; the fruit is a roundiſh, obtuſe, trilocular capſule, containing one or more cells, which are filled with many ſmall ſeeds.

TRACHEOTOMY, in ſurgery, the name of an operation otherwiſe called bronchotomy. See BRONCHOTOMY.

TRACT, in geography, an extent of ground, or a portion of the earth's ſurface.

TRACT, in matters of literature, denotes a ſmall treatiſe, or written diſcourſe, upon any ſubject.

TRAC-

TRACTION, the act of drawing, whereby a thing is brought nearer to the mover.

TRACTRIX, in geometry, a curve otherwiſe called catenaria. See CATENARIA.

TRADE, in general, denotes the ſame with commerce, conſiſting in buying, ſelling, and exchanging of commodities, bills, money, &c.

TRADE-WINDS, denote certain regular winds at ſea, blowing either conſtantly the ſame way, or alternately this way and that; thus called from their uſe in navigation, and the Indian commerce.

The trade-winds are of different kinds, ſome blowing three or ſix months of the year one way, and then the like ſpace of time the oppoſite way; theſe are very common in the Indian ſeas, and are called monſoons. See the article MONSOONS.

Others blow conſtantly the ſame way; ſuch is that general wind between the tropics, which off at ſea, is found to blow all day long from eaſt to weſt. For the phænomena of each, with their phyſical cauſes, ſee the article WIND.

TRADESCANTIA, Virginia ſpider-wort, in botany, a plant whoſe root is compoſed of ſeveral fleſhy fibres, from which ariſe ſeveral long, narrow, keel-ſhaped leaves, which are veined, rough on their edges, of a greyiſh colour, and ſucculent; between the leaves ariſes a thick jointed ſtalk about a foot long, furniſhed at each joint with one leaf; at the top of the ſtalk are two leaves which ſpread aſunder; the flowers come out in a kind of umbel, each formed of a triphyllous cup with three large roundiſh petals of a deep blue colour, which in the morning ſpread open, but ſhrink up in the middle of the day, and do not open again; the ſtamina conſiſt of ſix ſlender hairy filaments, topped with reniform antheræ; the fruit is an oval capſule, having three angles, and ſhut up in the cup, and includes a few angular ſeeds contained in three cells.

The root of this plant is perennial, and it is propagated by ſowing its ſeeds when ripe. This is the ſame with the ephemerum of Tournefort.

TRADITION, among eccleſiaſtical writers, denotes certain regulations regarding the rites, ceremonies, &c. of religion, which we ſuppoſe to have been handed down from the days of the apoſtles, to the preſent time.

Tradition is diſtinguiſhed into written, whereof there are ſome traces in the writings of the ancient fathers; and unwritten, whereof no mention is made in the writings of the firſt ages of Chriſtianity.

TRAGACANTHA, goats-thorn, in botany, a genus of plants, whoſe flower is papilionaceous; the vexillum is long, erect, indented at the point, and the borders reflexed; the wings are oblong, and ſhorter than the vexillum, and the carina is the length of the wings, and emarginated; the ſtamina conſiſts of ten filaments, nine of which are joined together, theſe are topped with roundiſh antheræ; the fruit is a ſhort ſwelling pod, having two longitudinal cells, which contain kidney-ſhaped ſeeds.

This genus is included by Linnæus among the aſtragalus. See ASTRAGALUS, GUM, &c.

Gum-tragacanth, or, as ſome call it, gum-adragant, or gum-dragon, is the produce of this ſhrub, which grows to about four feet high, and has a firm and robuſt ſtem, with numerous branches.

The gum is brought to us in long and ſlender pieces, of a flatted figure, more or leſs, and theſe not ſtrait, or rarely ſo; but commonly twiſted and contorted various ways, ſo as to reſemble worms. We ſometimes meet with it like the other vegetable exſudations, in roundiſh drops, but theſe are much more rare. It is moderately heavy, of a firm conſiſtence, and, properly ſpeaking, very tough rather than hard, and is extremely difficult to powder, unleſs firſt carefully dried, and the mortar and peſtle kept warm. Its natural colour is a pale whitiſh, and in the cleaneſt pieces it is ſomething tranſparent. It is often, however, met with tinged browniſh, and of other colours, and more opake. It has no ſmell, and very little taſte, but what it has is diſagreeable. Taken into the mouth, it does not grow clammy, and ſtick to the teeth, as the gum-arabic does, but melts into a kind of very ſoft mucilage. It diſſolves in water but ſlowly, and communicates its mucilaginous quality to a great quantity of that fluid. It is brought to us from the iſland of Crete, and from ſeveral parts of Aſia. It is to be choſen in long twiſted pieces, of a whitiſh colour, very clear, and free from all other colours; the brown, and particularly the black, are wholly to be rejected.

Tragacanth has the ſame virtues with gum-arabic, but in a greater degree. It greatly inſpiſſates and obtunds the acrimony of the humours, and is therefore found of vaſt ſervice in inveterate coughs, and other diſorders of the breaſt, ariſing from an acrid phlegm, and in ſtranguries, heat of urine, and all other complaints of that kind. It is uſually given in the compound powder, called the ſpecies diatragacantha frigidæ, rarely alone. It is alſo, by ſome, eſteemed a very great external remedy for wounds, and in this ſenſe made an ingredient in ſome ſympathetic powders, with vitriol and other things. It is by ſome recommended alone, in form of a powder or ſtrong mucilage, for cracks and chaps in the nipples of women: but it is found, by experience, to be a very troubleſome application in thoſe caſes, and to do more harm than good, as it dries by the heat of the part, and draws the lips of the wound farther aſunder than before.

TRAGEA, in pharmacy, an aromatic powder, groſly beaten and mixed with ſugar, taken by way of carminative.

TRAGEDY, a dramatic poem, repreſenting

ſome ſignal action performed by illuſtrious perſons, and which has frequently a fatal iſſue, or end.

Ariſtotle, more ſcientifically, defines tragedy, the imitation of one grave and entire action, of a juſt length, and which, without the aſſiſtance of narration, by raiſing of terror and compaſſion, refines and purges our paſſions. This definition has given the critics ſome perplexity; and Corneille declares he cannot reconcile Ariſtotle with himſelf: the inſtances Ariſtotle cites, he thinks, ruin his own definition; he even denies the purging our paſſions to be the end of tragedy. Our Engliſh authors are more favourable to the definition; by the purging our paſſions, they underſtand not the extirpating them, but the reducing them to juſt bounds; for by ſhewing the miſeries that attend a ſubjection to them, it teaches us to watch them more narrowly; and by ſeeing the great misfortunes of others, it leſſens the ſenſe of our own.

Tragedy, in its original, M. Hedelin obſerves, was only a hymn ſung in honour of Bacchus, by ſeveral perſons, who, together, made a chorus of muſic, with dances and inſtruments. As this was long, and might fatigue the ſingers, as well as tire the audience, they bethought themſelves to divide the ſinging of the chorus into ſeveral parts, and to have certain recitations in the intervals. Accordingly Theſpis firſt introduced a perſon upon the ſtage with this view. Æſchylus, finding one perſon inſufficient, introduced a ſecond, to entertain the audience more agreeably, by a kind of dialogue: he alſo cloathed his perſons more decently, and firſt put on them the buſkin.

The perſons who made theſe recitations on the ſcene, were called actors; ſo that tragedy was at firſt without actors. And what they thus rehearſed, being things added to the ſinging of the chorus, whereof they were no neceſſary part, were called epiſodes.

Sophocles found that two perſons were not enough for the variety of incidents, and accordingly introduced a third; and here the Greeks ſeemed to have ſtopped; at leaſt, it is very rare that they introduced four ſpeakers in the ſame ſcene.

Tragedy and comedy were, at firſt, confounded with each other, but were afterwards ſeparated; and the poets applied themſelves to the cultivating of tragedy, neglecting comedy. See the article COMEDY.

When tragedy was got into a better form, they changed the meaſure of its verſe, and endeavoured to bring the action within the compaſs of a day, or of a revolution of the ſun.

The Engliſh received the firſt plan of their drama from the French, among whom it had its riſe towards the end of Charles V. under the title of chant-royal, which conſiſted of pieces in verſe, compoſed in honour of the Virgin, or ſome of the ſaints, and ſung on the ſtage: they were called by the title of chant-royal, becauſe the ſubject was given by the king of the year, or the perſon who had borne away the prize the year preceding.

The humour of theſe pieces ran wonderfully among the people, inſomuch that in a little time there were formed ſeveral ſocieties, who began to vie with each other: one of theſe, to engage the town from the reſt, began to intermix various incidents or epiſodes, which they diſtributed into acts, ſcenes, and as many different perſons as were neceſſary for the repreſentation. Their firſt eſſay was in the Bourg St. Maur, and their ſubject the paſſion of our Saviour. The provoſt of Paris prohibiting their continuing of it, they made application to court; and to render it the more favourable to them, elected themſelves into a friary or fraternity, under the title of Brothers of the paſſion: which title has given ſome occaſion to ſuſpect them to have been an order of religious. The king, on ſeeing and approving ſome of theſe pieces, granted them letters of eſtabliſhment, in 1402; upon which they built a theatre, and for an age and a half acted none but grave pieces, till, the people growing weary of them, they began to intermix farces, or interludes, from prophane ſubjects.

The mixing of farce and religion diſpleaſing many, they were re-eſtabliſhed by an arret of parliament, in 1548, on condition of their acting none but proper, lawful, and decent ſubjects, without intermeddling with any of the myſteries of religion; and thus were the brothers of the paſſion deſpoiled of their religious character: upon which they mounted the ſtage no more in perſon, but brought up a new ſet of comedians, who acted under their direction.

Thus was the drama eſtabliſhed, and on this foundation arrived in England. In proceſs of time, as it was improved, it became divided into two branches, agreeable to the practice of the ancients, and the nature of things, viz. into tragedy and comedy, properly ſo called; and this laſt again was ſubdivided into pure comedy and farce. See the articles COMEDY and FARCE.

TRAGI-COMEDY, a dramatic piece partaking of the nature both of tragedy and comedy, the event whereof is not bloody or unhappy, and wherein is admitted a mixture of leſs ſerious characters.

The foundation of tragi-comedy is certainly bad; for endeavouring to make us laugh and cry by turns, it endeavours at contrary motions, which the heart can never undergo; every thing that diſpoſes for the one, indiſpoſing for the other: for which reaſon it is at preſent, with great juſtice, diſuſed. However, tragi-comedy is the only way wherein comedy is allowed to introduce kings and heroes.

TRAGIA, in botany, a genus of plants, producing male and female flowers on the ſame ſtalk;

neither has any corolla; the male flower conſiſting of a cup divided into three oval, acute, patent ſegments, with three filaments topped with roundiſh antheræ; the cup of the female flower is perſiſtent, and divided into five parts; it contains a roundiſh three furrowed germen, with an erect ſtyle, crowned with a trifid ſpreading ſtigma; the fruit is a roundiſh hiſpid capſule, having three cells, each containing a globoſe ſeed.

TRAGOPOGON, goats-beard, in botany, a genus of plants, whoſe flower is compound, imbricated, and uniform, conſiſting of a number of ligulated floſcules, quinquedentated at the ends; there is no pericarpium, but the ſeeds, which are oblong, angulated, rough, and crowned with a plumoſe down, are contained in the cup, and placed on a ſcabrous, naked, flat receptable

This genus includes the ſalſafy. See the article SALSAFY.

TRAGOSELINUM, in botany, Tournefort's name for the pimpinella of Linnæus. See the article PIMPINELLA.

TRAGUS, τραγος, in anatomy, one of the protuberances of the auricle, or external ear, called alſo hircus, becauſe uſually hairy. The tragus is that protuberance next the temple: that on the oppoſite ſide, to which the ſoft lobe of the ear is annexed, is called the antitragus. See the article EAR.

TRAJAN COLUMN, a famous hiſtorical column erected in Rome, in honour of the emperor Trajan. It is of the Tuſcan order, though ſomething irregular; its height is eight diameters, and its pedeſtal Corinthian: it was built in a large ſquare there, called Forum Romanum. Its baſe conſiſts of twelve ſtones, of an enormous ſize, and it is raiſed on a ſocle, or foot of eight ſteps; withinſide is a ſtair-caſe, illuminated with forty-four windows. It is 140 feet high, which is thirty-five ſhort of the Antonine column, but the workmanſhip of the former is much more valued. It is adorned from top to bottom with baſſo relievos, repreſenting the great actions of that emperor againſt the Dacæ.

TRAJECTORY *of a Comet*, is its path or orbit, or the line it deſcribes in its motion. See the article COMET.

TRAIL-BOARD, in a ſhip, a carved board on each ſide of her beak, which reaches from the main ſtem to the figure, or the brackets.

TRAIN, the attendance of a great perſon, or the trail of a gown, or robe of ſtate.

In falconry, it denotes the tail of an hawk.

TRAIN, is likewiſe uſed for the number of beats which a watch makes in an hour, or any other certain time.

TRAIN, is alſo uſed for a line of gun-powder, laid to give fire to a quantity thereof, in order to do execution by blowing up earth, works, buildings, &c.

TRAIN, or TRAILE *of Artillery*, includes the great guns, and other pieces of ordnance belonging to an army in the field. See the article CANNON.

TRAIN-OIL, the oil procured from the blubber of a whale by boiling.

TRAIN-BANDS, or TRAINED-BANDS, a name given to the militia of England.

TRAINING, or TRACING, in mineralogy, a term uſed by the miners, to expreſs the tracing up the mineral appearances on the ſurface of the earth to their head, or original place, and there finding a a mine of the metal they contain. See the article MINE.

TRAMBLING *of Tin Ore*, among miners, the waſhing it very clean, which is done in a ſhovel, and in a frame of boards. See the article TIN.

TRAMEL, an inſtrument, or divice, ſometimes of leather, more uſually of rope, fitted to a horſe's legs, to regulate his motions, and form him to an amble. It is alſo taken in many places for an iron moveable inſtrument in chimnies to hang pots over the fire.

TRANSACTION, *Tranſactio*, in the civil law, an accommodation of ſome buſineſs, or diſpute between two parties, by a mutual and voluntary agreement between them. See the article ACCOMMODATION.

Philoſophical TRANSACTIONS, a kind of journal of the principal things that come before the Royal Society. See the article SOCIETY.

TRANSCENDENTAL, or TRANSCENDANT, ſomething elevated, or raiſed above other things; which paſſes and tranſcends the nature of other inferior things.

Tranſcendental quantities, among geometricians, are indeterminate ones, or ſuch as cannot be fixed or expreſſed by any conſtant equation: ſuch are all tranſcendental curves, which cannot be defined by any algebraic equation: or which, when expreſſed by an equation, one of the terms thereof is a variable quantity. Now whereas algebraiſts uſe to aſſume ſome general letters or numbers, for the quantity ſought in theſe tranſcendental problems, Mr. Leibnitz aſſumes general or indefinite equations for the lines ſought; e. gr. putting x and y for the abſciſs and ordinate, the equation he uſes for a line is $a + bx + cy + exy + fxx + gyy$, &c. $= o$, by the help of which indefinite equation, he ſeeks the tangent; and by comparing the reſult with the given property of tangents, he finds the value of the aſſumed letters a, b, c, d, &c. and thus defines the equation of the line ſought.

If the compariſon above-mentioned, do not proceed, he pronounces the line ſought, not to be an algebraical, but a tranſcendental one. This ſuppoſed,

poſed, he goes on to find the ſpecies of tranſcendency; for ſome tranſcendentals depend on the general diviſion or ſection of a ratio, or upon the logarithms; others, upon the arcs of a circle; and others, upon more indefinite and compound inquiries.

He, therefore, beſides the ſymbols x and y, aſſumes a third, as v, which denotes the tranſcendental quantity; and of theſe three, forms a general equation for the line ſought, from which he finds the tangent, according to the differential method, which ſucceeds even in tranſcendental quantities.

The reſult he compares with the given properties of the tangent, and ſo diſcovers, not only the values of a, b, c, d, &c. but alſo the particular nature of the tranſcendental quantity. And though it may ſometimes happen, that the ſeveral tranſcendentals are ſo to be made uſe of, and thoſe of different natures too, one from another; alſo, though there be tranſcendents of tranſcendentals, and a progreſſion of theſe in infinitum, yet we may be ſatisfied with the moſt eaſy and uſeful one; and for the moſt part, may have recourſe to ſome peculiar artifices for ſhortening the calculus, and reducing the problems to as ſimple terms as may be.

This method being applied to the buſineſs of quadratures, or to the invention of quadratics, in which the property of the tangent is always given, it is manifeſt, not only how it may be diſcovered, whether the indefinite quadrature may be algebraically impoſſible; but alſo, how, when this impoſſibility is diſcovered, a tranſcendental quadratrix may be found, which is a thing not before ſhewn. So that it ſeems, that geometry, by this method, is carried infinitely beyond the bounds to which Vieta and Des Cartes brought it; ſince, by this means, a certain and general analyſis is eſtabliſhed, which extends to all problems of no certain degree, and conſequently not comprehended within algebraical equations.

Again, in order to manage tranſcendental problems, wherever the buſineſs of tangents or quadratures occurs, by a calculus, there is hardly any thing that can be imagined ſhorter, more advantageous, or more univerſal, than the differential calculus, or analyſis of indiviſibles and infinites. By this method, we may explain the nature of tranſcendental lines, by an equation; e. gr. let a be the arch of a circle, and x the verſed ſine; then will $a = \frac{S\,dx}{\sqrt{2x-xx}}$; and if the ordinate of the cycloid be y, then will $y = \sqrt{2x-xx} + \frac{S\,dx}{\sqrt{2x-xx}}$; which equation perfectly expreſſes the relation between the ordinate y and the abſciſs x, and from it all the properties of the cycloid may be demonſtrated.

Thus is the analytical calculus extended to thoſe lines, which have hitherto been excluded; for no other reaſon, but that they were thought incapable of it.

TRANSCRIPT, a copy of any original writing, particularly that of an act, or inſtrument, inſerted in the body of another.

TRANSFER, in commerce, &c. an act whereby a perſon ſurrenders his right, intereſt, or property, in any thing moveable or immoveable to another.

The term transfer, is chiefly uſed for the aſſigning and making over ſhares in the ſtocks, or public funds, to ſuch as purchaſe them of the proprietors.

TRANSFORMATION, in general, denotes a change of form, or the aſſuming a new form different from a former one.

The chemiſts have been for a long time ſeeking the transformation of metals; that is, their tranſmutation, or the manner of changing them into gold. See the article TRANSMUTATION.

TRANSFORMATION *of Equations*. The doctrine of the transformation of equations, and of exterminating their intermediate terms, is thus taught by Mr. Mac Laurin. The affirmative roots of an equation are changed into negative roots of the ſame value, and the negative roots into affirmative, by only changing the ſigns of the terms alternately, beginning with the ſecond. Thus, the roots of the equation, $x^4 - x^3 - 19x^2 + 49x - 30 = 0$, are $+1$, $+2$, $+3$, $+4$, -5; whereas the roots of the ſame equation having only the ſigns of the ſecond and fourth terms changed, viz. $x^4 + x^3 - 19x^2 - 49x - 30 = 0$, are -1, -2, -3, $+5$.

TRANSFUSION, *Tranſuſio*, the act of pouring a liquor out of one veſſel into another.

TRANSFUSION *of the Blood*, in ſurgery, the conveying of the arterial blood of one man, or animal, into the veins of another.

Notwithſtanding injections and transfuſions are ſeldom practiſed by our modern ſurgeons, they were highly celebrated, and often performed in the laſt century.

The generality of phyſicians, not without reaſon, attribute moſt diſorders of the body to ſome vice in the blood; and, therefore, ſome were led to think, that no method could be more ready to remove and correct that vice, than injecting a proper medicine in the veins to mix with the blood itſelf, or the transfuſing the ſound blood of one animal into the veins of another, inſtead of that which is diſeaſed. But, notwithſtanding the vaſt expectations which had been formed by phyſicians from this operation, frequently the event turned worſe than the diſeaſe; for we are told, that almoſt all the patients who have been treated this way, degenerated into a ſtupidity, fooliſhneſs, or a raving, or melancholy madneſs, or have been taken off with a ſudden death, either in, or not long after, the operations.

For the transfuſion of blood into the veins, firſt,

a vein is to be opened in the patient's arm, or hand, and then a ſmall tube of ſilver, braſs, or ivory, thruſt upward into it: the ſame is to be done with the ſound perſon, only the tube muſt here be inſerted downward, toward the ſmall end of the vein; this done, the ſmalleſt of the tubes is to be inſerted into the other larger one; by which means, as much blood will paſs from the ſound perſon into the patient, as may be thought proper, and then the inciſed veins are to be dreſſed, or bound up, as in bleeding: if the patient does not recover after the firſt transfuſion, the operation ſhould be repeated again, at convenient intervals; but before the patient receives the blood of the ſound perſon, he ought to be bled proportionably, that the new blood laſt received, may have the freer circulation. Sometimes a vein is opened in each arm of the patient at the ſame time, that as much of the vitiated blood may flow out of one orifice, as he receives of the ſound by the other.

If the blood is be transfuſed out of ſome animal into the patient, then a calf or a lamb, for example, is to be ſecured by ligatures, and one of their veins or arteries opened in the neck, leg, or thigh, and the reſt of the operation managed as before.

TRANSIT, *Tranſitus*, in aſtronomy, ſignifies the paſſage of any planet, juſt by, or over a fixed ſtar, or the ſun, and of the moon in particular, covering or moving over any planet.

TRANSITION, in muſic, is when a greater note is broken into a leſs, to ſoften the roughneſs of a leap by a gradual paſſage to the next note following; whence it is commonly called, the breaking of a note.

TRANSITION, in rhetoric, is of two ſorts; the firſt is when a ſpeech is introduced abruptly, without expreſs notice given of it; as when Milton gives an account of our firſt anceſtors' evening devotions.

> Both turn'd, and under open ſky ador'd
> The God that made both air, ſky, earth, and heav'n.—
> ——Thou alſo mad'ſt the night,
> Maker omnipotent, and thou the day!

The ſecond ſort of tranſition is, when a writer ſuddenly leaves the ſubject he is upon, and paſſes unto another, from which it ſeems different at firſt view, but has a relation and connection with it, and ſerves to illuſtrate and enlarge it.

TRANSITIVE, in grammar, an epithet applied to ſuch verbs as ſignify an action which paſſes from the ſubject that does it, to or upon another ſubject which receives it.

Under the head of verbs tranſitive, come what we uſually call verbs active and paſſive; other verbs, whoſe action does not paſs out of themſelves, are called neuters, and by ſome grammarians, intranſitives.

TRANSLATION, the act of transferring or removing a thing from one place to another; thus we ſay, the tranſlation of a biſhop's ſee, a council, a ſeat of juſtice, &c.

TRANSLATION, is alſo uſed for the verſion of a book, or writing, out of one language into another.

TRANSMARINE, ſomething that comes from, or belongs to, the parts beyond ſea.

TRANSMIGRATION, the removal or tranſlation of a whole people into another country, by the power of a conqueror.

TRANSMIGRATION, is particularly uſed for the paſſage of a ſoul out of one body into another, being the ſame with what we otherwiſe call metempſychoſis. See METEMPHSYCHOSIS.

TRANSMISSION, in optics, &c. the act of a tranſparent body paſſing the rays of light through its ſubſtance, or ſuffering them to paſs: in which ſenſe, the word ſtands oppoſed to reflection.

Tranſmiſſion is alſo frequently uſed in the ſame ſenſe with refraction, by which moſt bodies, in tranſmitting the rays, do alſo refract them.

The rays of light, Sir Iſaac Newton obſerves, are ſubject to fits of eaſy tranſmiſſion and reflection. See LIGHT.

For the cauſe of tranſmiſſion, or the reaſon why ſome bodies tranſmit, and others reflect the rays, ſee the articles OPACITY and TRANSPARENCY.

TRANSMUTATION, the act of transforming or changing one nature into another.

Nature, Sir Iſaac Newton obſerves, ſeems delighted with tranſmutations: he goes on to enumerate ſeveral kinds of natural tranſmutations; groſs bodies, and light, he ſuſpects, may be mutually tranſmuted into each other; and adds, that all bodies receive their active force from the particles of light, which enter their compoſition. For all fixed bodies, when well heated, emit light as long as they continue ſo; and again, light intermingles itſelf, and inheres in bodies, as often as its rays fall on the ſolid particles of thoſe bodies. Again, water, which is a fluid, volatile, taſteleſs ſalt, is by heat, tranſmuted into a vapour, which is a kind of air; and by cold, into ice, which is a cold tranſparent brittle ſtone, eaſily diſſolvable, and this ſtone is convertable again into water by heat, as vapour is by cold. See WATER, VAPOUR, ICE, &c.

Earth, by heat, becomes fire; and by cold, is converted into earth again: denſe bodies, by fermentation, are rarified into various kinds of air; and that air, by fermentation alſo, and ſometimes without, reverts into groſs bodies. Quickſilver ſometimes puts on the form of a fluid metal, ſometimes it appears in ſhape of a pellucid fragile ſalt, called ſublimate; ſometimes of a pellucid, volatile, white, taſteleſs earth, called mercurius dulcis; by diſtillation, it becomes vapour; and by agitation in vacuo, it ſhines like fire, &c. See the articles EARTH, MERCURY, &c.

All bodies, beaſts, fiſhes, inſects, plants, &c. with all their various parts, grow and increaſe out of water, and aqueous and ſaline tinctures; and by putrefaction, all of them revert into water or an aqueous liquor again. Farther, water expoſed a while to the open air, puts on a tincture, which, in proceſs of time, has a ſediment and a ſpirit, and before putrefaction, yields nouriſhment both for animals and vegetables.

TRANSMUTATION, in alchemy, denotes the art of changing or exalting imperfect metals into gold or ſilver.

This is alſo called the grand operation, and they ſay, is to be effected with the philoſopher's ſtone. See the article PHILOSOPHER'S STONE.

Some alchemiſts hold, that the tranſmutation ſhould rather be called the perfection of imperfect metals; as holding all metals, intended by nature to arrive equally at the perfection of gold, in as much as they are compoſed of the ſame matter; and that it is only the impurity of their matrices, that is, in the place wherein they are formed by nature, that has prevented their arriving thereat. The elixir being projected on any of theſe metals, it is ſuppoſed to purge and ſeparate the impure parts from the pure, and to join itſelf wholly to the mercury (which is the pureſt part) as being of the ſame nature.

Whether metals may be tranſmuted into one another, or not, is a point ſtrongly diſputed among philoſophers; the alchemiſts ſtrenuouſly aſſerting the affirmative.

TRANSMUTATION, in geometry, denotes the reduction or change of one figure, or body, into another of the ſame area or ſolidity, but of a different form; as a triangle into a ſquare, a pyramid into a parallelopiped, &c.

In the higher geometry, tranſmutation is uſed for the converting a figure into another of the ſame kind and order, whoſe reſpective parts riſe to the ſame dimenſions in an equation, admit of the ſame tangents, &c.

If a rectilinear figure be tranſmuted into another, it is ſufficient that the interſections of the lines which compoſe it, be transferred, and the lines drawn through the ſame in the new figure. If the figure to be tranſmuted be curvilinear, the points, tangents, and other right-lines, by means whereof the curve line is to be defined, muſt be transferred.

TRANSOM, among builders, denotes the piece that is framed acroſs a double light window. See WINDOW.

TRANSOM, among mathematicians, ſignifies the vane of a croſs-ſtaff, or a wooden number fixed acroſs, with a ſquare whereon it ſlides, &c. See CROSS-STAFF.

TRANSOM, in a ſhip, a piece of timber which lies athwart the ſtern, between the two faſhion-pieces, directly under the gun-room port.

TRANSPARENCY, *Diaphaneity*, in phyſics, a quality in certain bodies whereby they give paſſage to the rays of light; in contradiſtinction to opacity, or that quality of bodies which renders them impervious to the rays of light. See OPACITY.

TRANSPIRATION, the inſenſible, or almoſt inſenſible, paſſage of an excrementitious matter through the pores of the ſkin, called alſo perſpiration. See PERSPIRATION.

TRANPIRATION, is alſo uſed by ſome authors for the ingreſs or entrance of the air, vapour, &c. through the pores of the ſkin into the body.

Cardan, by this kind of tranſpiration, accounts for the prodigy of a woman, whoſe daily urine weighed twenty-ſeven pounds, though all the food ſhe took, both dry and liquid, did not exceed four pounds.

Dr. Baynard alſo ſuſpects ſome ſuch tranſpiration to be the caſe in hydropical perſons.

TRANSPLANTING, in agriculture aud gardening, the act of removing trees or plants from the places where they were ſowed, or raiſed, and planting them in others. See PLANTING.

TRANSPORTATION, the act of conveying or carrying a thing from one place to another.

Tranſportation is a kind of puniſhment, or more properly an alleviation or commutation of puniſhment, for criminals convicted of felony, who, for the firſt offence (unleſs it be an extraordinary one) are generally tranſported to the plantations, there to bear hard labour for a term of years; within which, if they return, they are executed without farther trial.

TRANSPORTATION *of Plants*, is the ſending of plants from one country to another; in performing which, great cautions are neceſſary.

The plants ſent from a hotter country to a colder, ſhould be always put on board in the ſpring of the year, that the heat of the ſeaſon may be advancing as they approach the colder climates; and, on the contrary, thoſe which are ſent from a colder country to a hotter, ſhould be ſent in the beginning of winter.

The beſt way of packing up plants for a voyage, if they be ſuch as will not bear keeping out of the earth, is to have boxes with handles, filling them with earth, and planting the roots as cloſe together as may be; the plants ſhould be ſet in theſe boxes three weeks before they are to be put on board; and in good weather they ſhould be ſet upon the deck; and in bad, removed or covered with a tarpaulin. If they are going from a hotter country to a colder one, they muſt have very little moiſture; if, on the contrary, they are going from a colder to a warmer, they may be allowed water more largely, and being ſhaded from the heat of the ſun, they will come ſafe.

A great many plants, however, will live out of

the earth a conſiderable while; as the ſedums, euphorbiums, ficoides, and other ſucculent ones. Theſe need no other care than the packing them up with moſs in a cloſe box; and there ſhould be a little hay put between them, to prevent their wounding or bruiſing one another; and holes bored in the boxes, to keep them from heating or putrefying.

In this manner they will come ſafe from a voyage of two or three, or even four or five months. Several trees alſo will come ſafe in the ſame manner; taking them up at a ſeaſon when they have done growing, and packing them up with moſs. Of this ſort, are oranges, olives, capers, jaſmines, and pomegranate-trees. Theſe, and many others, are annually brought over to us from Italy; and, tho' they are three or four months in the paſſage, ſeldom miſcarry.

The beſt way of ſending over ſeeds, is in their natural huſks, in a bag, or packed up in a gourd-ſhell, keeping them dry, and out of the way of vermin.

TRANSPOSITION, in algebra, the bringing any term of an equation over to the other ſide. See EQUATION.

TRANSPOSITION, in grammar, a diſturbing or diſlocating of the words in a diſcourſe, or a changing of their natural order of conſtruction, to pleaſe the ear by rendering the contexture more eaſy, ſmooth, and harmonious.

TRANSPOSITION, in muſic, is a changing of the notes of a piece of muſic, or the ſhifting a ſong from its former ſituation, to ſet it either higher or lower, or in another octave.

TRANSUBSTANTIATION, *Tranſubſtantiatio*, in theology, the converſion or change of the ſubſtance of the bread and wine in the euchariſt, into the body and blood of Jeſus Chriſt, which the Romiſh church hold is wrought by the conſecration of the prieſt.

This is a main point in the Romiſh religion, and is rejected by the Proteſtants; the former maintaining the tranſubſtantiation to be real, the latter only figurative; interpreting the text, *hoc eſt corpus meum*, "this ſignifies my body." But the council of Trent ſtood up ſtrenuouſly for the literal ſenſe of the verb *eſt*, and ſay expreſsly, that in tranſubſtantiation the body and blood of our Lord Jeſus Chriſt are truly, really, and ſubſtantially, under the ſpecies of bread and wine. The controverſies about this point, are almoſt innumerable.

TRANSUMPTION, *Tranſumptio*, in the ſchools, a ſyllogiſm by conceſſion or agreement, uſed where a queſtion propoſed is transferred to another, with this condition, that the proof of this latter ſhould be admitted for the proof of the former. See SYLLOGISM.

TRANSVERSALIS, in anatomy, a name given to ſeveral muſcles, &c. in reſpect of their ſituation, progreſs, &c. as, 1. The tranſverſalis abdominis, a muſcle which lies under the obliqui, and ariſes from the cartilago xiphoides, from the extremities of the falſe ribs, from the tranſverſe apophyſis of the vertebræ of the loins, is fixed to the inner ſide of the ſpine of the ileum, and inſerted in the os pubis and linea alba. This, with the obliqui, unites its tendons as it approaches the linea alba, and is the only muſcle that is cut in the operation of the bubonocele. It has a fine and thin membrane, that cloſes exactly its ring, or hole through which the veſſels paſs.

2. Tranſverſalis colli, is ſaid to be a part of the longiſſimus dorſi. It ariſes from the os ſacrum, and from all the tranſverſe proceſſes of the vertebræ of the loins, back, and neck, except the two firſt; and is inſerted by ſo many diſtinct tendons into all the ſuperior ſpines. It moves the whole ſpine obliquely backwards.

3. Tranſverſalis pedis placentini, comes from the bone of the metatarſus that ſuſtains the toe next the little toe, and paſſing acroſs the other bones, is inſerted into the os ſeſamoides of the toe. Its uſe is to bring all the toes cloſe to one another.

4. Tranſverſalis penis, one of the dilators of the urethra, ariſing from the tubercle of the os iſchium on each ſide, and inſerted into the poſterior part of the bulb of the urethra; however, theſe muſcles are not quite determinate and certain in their origin or inſertion, and ſometimes they are wholly wanting: when they act, they dilate the urethra in its poſterior part.

5. Tranſverſalis is alſo a name given to a ſuture of the cranium, becauſe of its traverſing or croſſing the face from one ſide to another. See the article SKULL.

TRANSVERSE, ſomething that goes acroſs another, from corner to corner: thus, bends and bars, in heraldry, are tranſverſe pieces or bearings: the diagonals of a parallelogram, or a ſquare, are tranſverſe lines: lines which make interſections with perpendiculars, are alſo called oblique or tranſverſe lines.

TRANSVERSE-MUSCLES, in anatomy, are certain muſcles ariſing from the tranſverſe proceſſes of the vertebræ of the loins.

TRAPA, in botany, a genus of plants, whoſe flower conſiſts of four oval petals, larger than the cup, with the ſame number of ſtamina: there is no pericarpium, but the ſeed conſiſts of an ovato-oblong nut, armed with four ſharp thick ſpines, placed oppoſitely in the middle of the ſides, and pointed, and contains a ſingle kernel of an oval figure.

TRAPEZIUM, in geometry, a plane figure contained under four unequal right lines.

1. Any three ſides of a trapezium taken together, are greater than the third.

2. The two diagonals of any trapezium, divide into four proportional triangles.

3. If two ſides of a trapezium be parallel, the rectangle

rectangle under the aggregate of the parallel ſides and one half their diſtance is equal to that trapezium.

4. If a parallelogram circumſcribes a trapezium, ſo that one of the ſides of the parallelogram be parallel to a diagonal of the trapezium, that parallelogram will be the double of the trapezium.

5. If any trapezium has two of its oppoſite angles, each a right angle, and a diagonal be drawn joining theſe angles; and if from the other two angles be drawn two perpendiculars to that diagonal, the diſtance from the feet of theſe perpendiculars to thoſe right-angles, reſpectively taken, will be equal.

6. If the ſides of a trapezium be each biſſected, and the points of biſſection be joined by four right-lines, theſe lines will form a parallelogram, which will be one half of the trapezium.

7. If the diagonals of a trapezium be biſſected, and a right line joins theſe points, the aggregate of the ſquares of the ſides is equal to the aggregate of the ſquares of the diagonals, together with four times of the ſquare of the right line joining the point of biſſection.

8. In the trapezium, the aggregate of the diagonals is leſs than the aggregate of four right lines drawn from any point (except the interſection of the diagonals) within the figure.

TRAPEZIUS, in anatomy. See the article CUCULARIS.

TRAPEZOID, is a ſolid irregular figure, having four ſides not parallel to one another.

TRAVELLERS-JOY, in botany, the Engliſh name for a ſpecies of clematitis. See the article CLEMATITIS.

TRAVERSE, or TRANSVERSE, in general, denotes ſomething that goes athwart another; that is, croſſes and cuts it obliquely.

Hence, to traverſe a piece of ordnance, among gunners, ſignifies to turn or point it which way one pleaſes, upon the platform.

In fortification, traverſe denotes a trench with a little parapet, or bank of earth, thrown perpendicularly acroſs the moat, or other work, to prevent the enemy's cannon from raking it. Theſe traverſes may be from twelve to eighteen feet, in order to be cannon proof, and their height about ſix or ſeven feet, or more, if the place be expoſed to any eminence. And to preſerve a communication, a paſſage of five or ſix feet wide muſt be left at one end of the traverſe.

If any part of a work, thus fenced in by one or more traverſes, is likely to be defended by the muſketry, it will be proper to add to the traverſes one or more footbanks within the defence, for the troops to mount on, when they want to fire over the traverſe.

TRAVERSE, in navigation, is a compound courſe, wherein ſeveral different ſucceſſive courſes and diſtances are known.

To work a traverſe, or to reduce a compound courſe to a ſingle one, 1. Make a table of ſix columns, marked courſe, diſtance, N. S. E. W. beginning at the left-hand, and write the given courſes and diſtances in their proper columns. 2. Seek the given courſes and diſtances in the traverſe table, and let the correſponding differences of latitude and departure be wrote in their proper columns in the table made for the queſtion. 3. Add up the columns of northing, ſouthing, eaſting, and weſting; then the difference between the ſums of northing and ſouthing, gives the whole difference of latitude, which is of the ſame name with the greater; and the difference between the ſums of eaſting and weſting will be the whole departure, which is likewiſe of the ſame name with the greater. 4. The whole diff. lat. and depart. to the compound courſe being found, the direct courſe and diſtance will be found.

TRAVERSE, in law, denotes the denial of ſome matter of fact alledged to be done in a declaration, or pleadings; upon which the other ſide coming and maintaining that it was done, iſſue is joined for the cauſe to proceed to trial.

TRAVERSE *of an Indictment*, or *Preſentment*, is the contradicting or denying ſome chief point of it, and taking iſſue thereon.

TRAVERSE *of an Office*, is the proving that an inquiſition made by lands or goods, is defective and untruly made.

TRAVESTY, or TRAVESTI, a French term, derived from the verb *traveſtir*, to diſguiſe one's ſelf, or to appear in maſquerade: and hence, traveſty is applied to the diſfiguring of an author, or the tranſlating him into a ſtyle and manner different from his own, by which means it becomes difficult to know him.

TRAUMATICS, the ſame with vulnerary medicines. See VULNERARY.

TREACLE, *Theriaca*, in pharmacy. See the article THERIACA.

Some alſo give the name treacle to melaſſes; and in this ſenſe it is that Dr. Shaw, in his Eſſay on diſtillery, has endeavoured to bring into uſe ſeveral ſorts of treacles, which might be made at home, and would ſerve very conveniently for the diſtillation of ſpirits, or the making of potable liquors. Theſe are the inſpiſſated juices or decoctions of vegetables: ſuch as the ſweet juice of the birch, or ſycamore, procured by tapping or piercing the trees in ſpring, and the common wort made from malt, or from other vegetable ſubſtances treated in the ſame manner. Theſe liquors are ſeverally to be boiled down in a copper till they begin to inſpiſſate, and then to be poured into a balneum mariæ, when the remainder of the evaporation may be finiſhed

niſhed without burning the inſpiſſated juices: thus prepared, it may be at any time reduced to the ſtate of wort, only by adding a ſufficient quantity of warm water. See TAPPING.

TREASON, in general, ſignifies betraying; but is more particularly uſed for the act or crime of infidelity to one's lawful ſovereign.

Treaſon is divided, by lawyers, into high-treaſon, and petty-treaſon. The firſt of theſe is an offence committed againſt the ſecurity of the king or kingdom; as to compaſs, or imagine, the death of the king, queen, or their eldeſt ſon and heir; or in caſe a perſon does violate or deflower the king's wife, or his eldeſt daughter unmarried, or the wife of the king's eldeſt ſon; or if he levy war againſt the king within his kingdom, or adhere to his enemies, give them aid or comfort within the realm, or elſewhere; or if he counterfeit the king's great or privy ſeal, or his money, or bring falſe money into the kingdom, like to what we have here, and utter the ſame: if he kill the chancellor, treaſurer, juſtices of either bench, juſtices of aſſize, or of oyer and terminer, ſitting in judgment and repreſenting the king's perſon, in the execution of his office: all theſe caſes are deemed treaſon by 25 Ed. III. c. 2. which ſtatute is made the only ſtandard of high-treaſon; and 1 Mary c. 1. takes away the power of the king and parliament to adjudge any thing elſe to be high-treaſon but what is declared to be ſuch therein: it is true, temporary ſtatutes of late times enacted, have made ſome other offences treaſon, as relating to papiſts and the proteſtant ſucceſſion.

It has been held, that words only, where they are deliberate, and ſhew a direct purpoſe againſt the king's life, will amount to an overt-act of compaſſing or imagining his death, and are high-treaſon: for words are the moſt natural way of expreſſing the imagination of the heart, and may be good evidence of it: not only words of perſuaſion to kill the king, but ſuch as are ſpoken in order to draw away the affections of his people, and to ſtir them up againſt him, are tending to the king's death, and therefore treaſon. Likewiſe where a perſon intends by force to preſcribe laws to the king, or to reſtrain him of his royal power, it has been adjudged an intention to deprive him of his crown and life: and in the eye of the law, every rebellion is a treaſonable plot againſt the life of the king, for a rebel would not ſuffer that king to live and reign, who would puniſh his offence.

As to make a crime treaſon, there muſt be always ſome overt-act; a bare conſpiracy, or compaſſing to levy war, is no ſuch act, unleſs it be really levied; in which caſe the conſpirators are all traitors, although they are not in arms: perſons that raiſe forces for any public end or purpoſe, or who make an inſurrection on any account, are ſaid to levy war againſt the king, though perhaps without a direct deſign againſt his perſon; and it extends to the caſe where great numbers forcibly endeavour to remove certain perſons from the king, &c. The adhering to the king's enemies, is taken to be an adherence againſt him, and even out of the realm it is treaſon: and it is ſaid, that cruiſing in a ſhip of war with an intent to deſtroy the king's ſhips, though no act of hoſtility be committed, is an overt-act of adhering, comforting, and aiding.

All trials for high-treaſon are to be according to the courſe of the common law; and perſons indicted for this crime, are to have a copy of this indictment five days before their trial, that they may have ſufficient time to adviſe with council; they ſhall likewiſe be permitted to make a full defence by their council learned in the law, and by lawful witneſſes, &c. And in this caſe there muſt be two evidences to the ſame overt-act, or to two acts of the ſame treaſon, produced face to face againſt them.

It is alſo ſaid, where a perſon is convicted of treaſon, the omiſſion of any neceſſary part of the judgment will be held to be error, on which he may reverſe the attainder; as the judgment is ſeverer, and more formidable, in caſe of high-treaſon than for any other crime whatever; ſince the offender is to be hanged, drawn, and quartered, and alſo forfeit his lands and goods to the king.

Petty-Treaſon, is where a ſervant kills his maſter, a wife her huſband, or a ſecular or religious perſon kills his prelate or ſuperior, to whom he owes faith and obedience; and aiders and abetters, as well as procurers, are within the act. However, ſo ſtrictly is the ſtatute conſtrued, that no caſe not expreſly mentioned therein is puniſhable by it: hence if a ſon kill his father, he ſhall not be tried for petty treaſon, except he ſerved his father for wages, in which caſe he is to be indicted under the name of a ſervant.

Petty-treaſon implies the higheſt degree of murder, and occaſions the forfeiture of lands by eſcheat to the lord of the fee; and the farther puniſhment of the criminal is to be hanged, drawn, and quartered for it, and a woman to be burnt.

TREASURE, in general, denotes a ſtore or ſtock of money in reſerve.

Treaſure-trove, in law, is where any treaſure is found buried in the earth, but not lying on the ground, and no man knows to whom it belongs: this, in England, belongs to the king; and to conceal it, is puniſhable by fine and impriſonment.

TREASURER, an officer to whom the treaſure of a prince, or corporation, is committed to be kept and duly diſpoſed of.

The lord high treaſurer of Great-Britain, or firſt commiſſioner of the treaſury, when in commiſſion, has under his charge and government all the king's re-

revenue, which is kept in the exchequer. He holds his place during the king's pleaſure, being inſtituted by the delivery of a white ſtaff to him: he has the check of all the officers employed in collecting the cuſtoms and other royal revenues; and in his gift and diſpoſition, are all the offices of the cuſtoms in the ſeveral ports of the kingdom; eſcheators in every county are nominated by him; he alſo makes leaſes of the lands belonging to the crown.

There is, beſides the lord-treaſurer, a treaſurer of the king's houſhold, who is of the privy-council, and, with the comptroller and ſteward of the Marſhalſea, has great power.

To theſe may be added the treaſurer of the navy; as alſo the treaſurer of the king's chamber, and of the wardrobe; and moſt corporations throughout the kingdom have treaſurers, whoſe office is to receive their rents, and diſburſe their common expences.

TREASURY, the place wherein the revenues of a prince are received, preſerved, and diſburſed.

In England, the Treaſury is part of the Exchequer, by ſome called the Lower Exchequer. See EXCHEQUER.

TREATISE, *Tractatus*, a ſet diſcourſe in writing on any ſubject.

A treatiſe is ſuppoſed more expreſs, formal, and methodical than an eſſay, but leſs ſo than a ſyſtem. See ESSAY and SYSTEM.

TREATY, a covenant between two or more nations; or the ſeveral articles and conditions ſtipulated and agreed upon between ſovereign powers.

Treaties are of various kinds; as treaties of peace, of alliance, of commerce, &c. for the guaranty of which, ſee the article GUARANTY.

TREBLE, in muſic, the higheſt or acuteſt of the four parts in ſymphony, or that which is heard the cleareſt and ſhrilleſt in a concert. See the article CLEFF.

TREE, *Arbor*, the firſt and largeſt of the vegetable creation, conſiſting of a ſingle trunk, or ſtem, from which iſſueth forth branches, leaves, flowers, and fruit.

There are various kinds of trees; ſome deciduous, as the elm, lime, &c. others evergreen, as the fir, pine, holly, yew, &c. They are alſo diſtinguiſhed, in the nurſeries, into dwarfs and ſtandards, particularly fruit-trees. See the articles PLANTING, PRUNING, DWARF, STANDARD, FRUIT-TREES, &c.

TREE-MOSS, *Lichen*, in botany. See the article LICHEN.

TREFOIL, *Trefolium*, in botany, a genus of plants, whoſe flowers are collected into an umbellated head; they are each papilionaceous, and in ſome ſpecies withering, and others perſiſtent; the vexillum is reflexed, the alæ are ſhorter than the vexillum, and the carina ſhorter than the wings: the fruit is a ſhort unvalvular pod, containing a few roundiſh ſeeds. Of this genus the clover is a ſpecies. See CLOVER.

Marſh-TREFOIL, *Trifolium Paluſtre*, in botany, &c. the ſame with the menyanthes, or buck-bean. See MENYANTHES.

Shrub-TREFOIL, *Cytiſus*, in botany. See the article CYTISUS.

TREMELLA, in botany, a genus of cryptogamious plants, of the flag-kind; they conſiſt of an uniform ſubſtance, which is foliacious, pellucid, and membranaceous, and in ſome reſpects like the lichen. See LICHEN.

TREMBLING *of the Joints*, or TREMOR, is an involuntary ſhaking, chiefly of the hands and head, ſometimes of the feet, and ſometimes of the tongue and heart.

It is a diſorder which frequently attacks perſons advanced in years, and ſometimes the younger ſort. It ſeems to ariſe from a defect of ſpirits, ſometimes from terror, or other violent paſſion, and ſometimes from a plethora. Too much drinking of coffee alſo produces a tremor in ſome perſons, as too plentiful drinking and ſurfeits will in others.

Tremors are often dangerous, as being apt to degenerate into other nervous diſtempers; as ſpaſms, the palſy, lethargy, apoplexy, &c.

In the cure, thoſe things ſhould be avoided that promote the diſeaſe, and the patient ſhould drink balm or ſage tea, or a diet-drink made of china-root; peruvian bark may alſo be taken, in an infuſion of balm or ſage, or ſuccinated ſpirit of hart's-horn, twice or thrice in a day; and in the evening an antiſpaſmodic powder may be taken, eſpecially if the patient is hot, or uſes much wine.

Outwardly, the neck and ſpine of the back may be rubbed with the ſpirits of ants, earth-worms, and ſal ammoniac, mixed together; a fourth part of the volatile ſpirits will be ſufficient, or opodeldoc may be uſed in their ſtead. If the patient is plethoric, bleeding is uſeful; and in old perſons, a draught of generous wine at meals: pediluvia, hot-baths, and mineral waters, may be alſo uſed, but with caution.

As to the medicine commonly uſed in tremors and other nervous diſtempers, under the name of palſy-drops, it is no other than compound ſpirit of lavender; the moſt ſucceſsful way of uſing which is, by taking thirty or forty drops twice or thrice a day, dropped on loaf-ſugar, or a little bread. It is ſuppoſed, that by this way, the moſt ſpirituous and efficacious parts make their way directly by the nerves of the palate, &c. without undergoing the courſe of the circulation, as it is ſaid to do when taken in a liquid vehicle.

TRENCHES, in fortification, are ditches cut by the beſiegers, that they may approach more ſecurely to the place attacked; whence they are alſo called

lines of approach. The tail of the trench is the place where it was begun, and its head is the place where it ends.

The trenches are uſually opened, or begun, in the night time; ſometimes within muſket ſhot, and ſometimes within half or whole cannon-ſhot of the place. They are carried on in winding lines, nearly parallel to the works of the fortreſs, ſo as not to be in the view of the enemy, nor expoſed to the enemy's ſhot.

The workmen employed in the trenches are always ſupported by a number of troops, to defend them againſt the ſallies of the beſieged: the pioneers ſometimes work on their knees, and are uſually covered with mantlets or fauciſſons; and the men who ſupport them lie flat on their faces, in order to avoid the enemy's ſhot.

TRENTAL, or TRIGINTAL, a Romiſh office for the dead, conſiſting of thirty maſſes rehearſed for thirty days ſucceſſively after the party's death. See MASS.

TREPAN, *Terebra*, *Modiolus*, &c. in ſurgery, an inſtrument uſed in trepanning. See the next article.

TREPANNING, in ſurgery, a perforation, or opening, made in the bones of the cranium, or ſkull. See the article CRANIUM.

This operation was performed by the ancients, not only in fractures and depreſſions of the cranium, but alſo in thoſe other obſtinate diſorders of the head and brain, which could not be relieved by internal medicines, and the uſe of iſſues upon the coronal future; but the modern ſurgeons never uſe the trepan for internal diſorders of the head, though they ſeldom neglect it in fractures and depreſſions of the cranium.

The trepan is therefore uſeful, not only in theſe caſes, to elevate the depreſſed parts of a fractured bone in the cranium, but alſo to diſcharge the extravaſated blood through an aperture made by this inſtrument. See the articles CONTRA-FISSURE, CONTUSION, EXTRAVASION, &c.

The leſs time there is loſt, the better, before the application of the trepan, but the operation itſelf muſt be conducted ſlowly and carefully; for it is extremely difficult, if not impoſſible, to take out a piece of the cranium by this inſtrument, without injuring the ſubjacent dura mater, to which it is moſt intimately attached. See DURA MATER.

For this reaſon, Heiſter is induced to condemn the advice of thoſe who direct to trepan the cranium immediately upon every ſlight diſorder of it: he therefore adviſes, firſt, to try the uſe of other remedies, both external and internal, rather than immediately ſubject the patient to the trepan, before it is abſolutely neceſſary.

In general, the place where the fiſſure appears will be the moſt convenient to apply the trepan, if nothing indicates the contrary; but in fractures, it will be proper to trepan a little below the injured part, that the extravaſated blood may be more eaſily diſcharged.

After having pitched upon the part to be trepanned, the next buſineſs is to ſhave the ſcalp, and make an inciſion through the integuments to lay bare the cranium, except it be done already by the wound. The inciſions of the integuments may be made in the form of a croſs, large enough to admit the crown of the trepan upon the bone.

TREPIDATION, in medicine, the ſame with tremor. See TREMBLING.

TREPIDATION, in the ancient aſtronomy, denotes what they call a libration of the eighth ſphere, or a motion which the Ptolemaic ſyſtem attributed to the firmament, to account for certain and almoſt inſenſible changes and motions obſerved in the axis of the world, by means whereof the latitudes of the fixed ſtars come to be gradually changed, and the ecliptic ſeems to approach reciprocally firſt towards one pole, then towards the other.

This motion is called the motion of the firſt libration. See the articles LIBRATION and TITUBATION.

TRESPASS, in law, ſignifies any tranſgreſſion of the law, under treaſon, felony, or miſpriſion of either; but it is moſt commonly uſed for any wrong or damage that is done by one private perſon to another, or to the king in his foreſt, &c.

In this ſenſe, treſpaſs is of two ſorts: treſpaſs general, which is called treſpaſs *vi et armis*; and treſpaſs ſpecial, or treſpaſs upon the caſe. Treſpaſſes againſt a man's perſon are ſuch as theſe, viz. threatening to hurt him, on aſſaulting or ſetting one to beat him; a battery, which is an actual beating or maiming a man ſo that he loſe the uſe of his limbs; an unlawful impriſonment of another, or illegally reſtraining him of his liberty.

Treſpaſſes committed againſt a man's property may be in ſeveral ways, as againſt his wife, children, or ſervants, or his houſe and goods, &c. or againſt his lands, by carrying away the deeds, or other evidences, concerning the ſame; cutting trees or damaging the graſs therein. An action of treſpaſs, *vi et armis*, lies for a perſon who has the poſſeſſion of goods, or of a houſe, or land, if he be diſturbed in his poſſeſſion, for this reaſon, that ſuch diſturbance, beſides the private damage, is alſo a breach of the peace; and in caſe the defendant be convicted at common law, he is liable to be fined and impriſoned. The difference between this action and treſpaſs on the caſe is, that the one lies where the original act was a wrong in itſelf, and the other where it is conſequential to a lawful act. A defendant in treſpaſs ſhall in no caſe be excuſed, unleſs it be upon an unavoidable neceſſity; therefore, where there is only a force in law, as if a perſon enters into another's land, he muſt be requeſted to go out before hands are laid on him,

but it is otherwiſe when there is an actual force committed.

The defendant in treſpaſs can, by his plea, put the plaintiff to a new aſſignment of the place where, &c.

TRESSURE, in heraldry, a diminutive of an orle, uſually held to be half the breadth thereof.

TRET, in commerce, an allowance made for the waſte, or the dirt, that may be mixed with any commodity, which is always four pounds in every one hundred and four pounds weight.

TREWIA, in botany, a genus of plants, whoſe flower is apetalous; the cup contains a great number of ſtamina, and the fruit is a turbinated, three-cornered, coronated capſule, having three valves and three cells, each containing a ſingle ſeed, convex on one ſide and angular on the other.

TRIAL, in law, the examination of a cauſe, civil or criminal, according to the laws of the land, before a proper judge: or, it is the matter and order obſerved in the hearing and determining of cauſes.

There are divers kinds of trials; as thoſe of matters of fact, which muſt be tried by a jury; matters of law, which are only triable by the courts; and matters of record, which are to be tried by the records themſelves.

TRIANDRIA, in botany, the name of the third claſs in the Linnæan ſyſtem, conſiſting of thoſe plants which bear hermaphrodite flowers, each containing three ſtamina, or male parts.

To this claſs belong the reed, barley, wheat, &c. with moſt of the graſs tribe.

TRIANGLE, in geometry, a figure of three angles.

Triangles are either plane or ſpherical. A plane triangle is contained under three right lines; and a ſpherical one is a triangle contained under three arches of great circles of the ſphere. See the article SPHERE.

Triangles are denominated, from their angles, right, obtuſe, and acute.

A right-angled triangle is that which has one right angle, as A B C, (plate LXXXIII. fig. 1.)

An obtuſe-angled triangle is ſuch as has one obtuſe angle; as D E F; (fig. 2.)

And an acute-angled triangle is that which has all its angles acute; as *g h i*, G H I, (fig. 3 and 4.) See the article ANGLE.

And here it may not be improper to explain other diſtinctions of triangles.

Any triangle that is not right-angled, is called oblique-angled, or amblygonial.

An equilateral-triangle is that which has all its ſides equal; as *g h i*, (fig. 3.)

An iſoſceles-triangle is one that has only two ſides equal; as G H I, (fig. 4.)

And a ſcalenous-triangle is one that has no two ſides equal; as D E F, (fig. 2.)

In every triangle the ſines of the ſides are proportional to the ſines of the oppoſite angles; alſo the ſine of all the three angles is equal to two right ones; and the external angle, made by any ſide produced, is equal to the ſum of the two internal and oppoſite angles: thus $\angle e$ E D, (fig. 2.) $= \angle$ E F D + F D E.

Triangles on the ſame baſe, and having the ſame height or place, between the ſame parallels, are equal: alſo triangles on equal baſes, and between the ſame parallels, are equal. If a perpendicular be let fall upon the baſe of an oblique-angled triangle, the difference of the ſquares of the ſides is equal to the double rectangle under the baſe, and the diſtance of the perpendicular from the middle of the baſe. The ſide of an equilateral triangle, inſcribed in a circle, is in power triple of the radius. The ſides of a triangle are cut proportionably, by a line drawn parallel to its baſe. A whole triangle is to a triangle cut off by a right line drawn parallel to the baſe, as the rectangle under the cut ſides is to the rectangle of the two other ſides. In a right-angled triangle, a line drawn from the right-angle at the top, perpendicular to the hypothenuſe, divides the triangle into two other right-angled triangles, which are ſimilar to the firſt triangle, and to one another. In every right-angled triangle, the ſquare of the hypothenuſe is equal to the ſum of the ſquares of the other two ſides; that is, AC^2 (fig. 1.) $= AB^2 + BC^2$. If any angle of a triangle be biſſected, the biſſecting-line will divide the oppoſite ſide in the ſame proportion as the legs of the angle are to one another. Every triangle is one half of a parallelogram of the ſame baſe and height.

The area of any triangle may be had by adding all the three ſides together, and taking half the ſum, and from that half ſum ſubtracting each ſide ſeverally, and multiplying that half ſum and the remainder continually into one another, and extracting the ſquare root of the product.

For the ſolving the ſeveral caſes of plane and ſpherical triangles, ſee the article TRIGONOMETRY.

TRIANGULAR *Compaſſes*, are ſuch as have three legs, or feet, whereby to take off any triangle at once; much uſed in the conſtruction of maps, globes, &c.

TRIANGULAR *Numbers*, are a kind of polygonal numbers, being the ſums of arithmetical progreſſions, the difference of whoſe terms is 1.

Thus of arithmetical progreſſion, 123456, are formed triangular numbers 136101521.

TRIANGULAR *Canon*, the tables of artificial ſines, tangents, ſecants, &c.

TRIANGULAR *Quadrant*, is a ſector furniſhed with a looſe piece, whereby to make an equilateral triangle.

The calendar is graduated thereon, with the ſun's place, declination, and other uſeful lines; and by the

the help of a ſtring and a plummet, and the diviſions graduated on the looſe piece, it may be made to ſerve for a quadrant.

TRIANGULARIS, in anatomy, a name given to two muſcles of the lips, which ariſe each from the lateral and under part of the lower jaw; from whence they aſcend obliquely to the angle of the orbicularis.

There is alſo a muſcle of the breaſt called triangularis ſterni, which riſes from the lower and interior part of the ſternum, and is inſerted on each ſide into the cartilages of the fourth, fifth, ſixth, and ſeventh true ribs: it is one of the conſtrictor or depreſſor muſcles of the breaſt.

One of the dilatator muſcles of the urethra is alſo called triangularis, from its figure: it riſes from the anterior part of the ſphincter of the anus, and is inſerted into the poſterior and lower parts of the accelerators, or elſe into the bulb of the urethra.

TRIANTHEMA, in botany, a genus of plants, whoſe flower conſiſts of oval, equal, and patent petals, with ten filaments, topped with oval twin antheræ; the fruit is a cylindric unilocular capſule, a little compreſſed, and contains ten rough kidney-ſhaped ſeeds.

TRIBULUS, caltrop, in botany, a genus of plants, whoſe flower conſiſts of five oblong, obtuſe, and patent petals, with ten ſmall ſubulated ſtamina; the fruit is roundiſh and aculeated, being compoſed of five capſules, gibbous on one ſide, and armed with three or four points on the other, and joined together, each containing a few oblong turbinated ſeeds.

TRIBUNAL, in general, denotes the ſeat of a judge, called in our courts, bench.

The word is Latin, and takes its origin from the ſeat where the tribune of the Roman people was placed to adminiſter juſtice.

The name tribunal was alſo given to the place from whence the people of ancient Rome were harangued.

TRIBUNE, *Tribunus Plebis*, among the ancient Romans, a magiſtrate choſen out of the commons, to protect them againſt the oppreſſions of the great, and to defend the liberty of the people againſt the attempts of the ſenate and conſuls.

TRIBUTARY, *Tributarius*, one who pays tribute to another, in order to live in peace with him, or ſhare in his protection.

TRIBUTE, *Tributum*, a tax or impoſt which one prince or ſtate is obliged to pay to another as a token of dependence, or in virtue of a treaty, and as a purchaſe of peace.

TRICEPS, in anatomy, the abductor muſcle of the thigh, having three heads, and as many inſertions: the firſt and ſecond heads of this muſcle ariſe from the os pubis, near the ſynchondroſis; the third, from the tubercle of the iſchium; and it is inſerted into the whole ſpine of the os femoris.

TRICHIASIS, in ſurgery, an inverſion of the eye-lids, whereby the eye-laſhes hurt the eyes.

TRICHILIA, in botany, a genus of plants, whoſe flower conſiſts of five lanceolated patent petals, with a cylindric tubuloſe nectarium, cut at the mouth into five indentures; the ſtamina have no filaments, but conſiſt of ten erect aſſurgent antheræ; the fruit is a roundiſh almoſt trigonal capſule, having three cells, each containing a ſingle ſeed.

TRICHOMANES, in botany, a genus of cryptogamious plants, of the fern kind; the viſible parts of the fructification conſiſts of a turbinated erect calyx ſtanding ſingly on the very margin of the leaf, and a ſetaceous ſtyle terminating the capſule.

TRICHOSANTHES, in botany, a genus of plants, whoſe flowers are male and female, and grow on the ſame plant; the male flower is monopetalous, and divided into five ſegments, and contains three very ſhort filaments, topped with cylindrical erect antheræ joined in a body; the female flower is like the male, and the fruit is long, ſucculent, and trilocular, containing many obtuſe compreſſed ſeeds. This genus comprehends the anguina of Micheli.

TRICHOSTEMA, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is very ſhort, the upper-lip is compreſſed and falcated, and the under one is divided into three parts, the middle one being oblong and ſmalleſt; the ſtamina are four very long filaments, topped with ſingle antheræ; there is no pericarpium, but the cup contains four roundiſh ſeeds.

TRICUSPIDES VALVÆ, in anatomy, a name given to the mitral valves, placed at the juncture of the right auricle and ventricle of the heart.

TRIDAX, American ſtarwort, in botany, a genus of plants, whoſe flowers is compound and radiated, conſiſting of hermaphrodite florets, which form the diſc, and ligulated female corollulæ, which compoſe the rays; the cup, which is cylindrical and imbricated, contains the ſeeds, which are oblong and crowned with down.

TRIDENT, *Tridens*, an attribute of Neptune, being a kind of ſceptre which the painters and poets put into the hands of that god, in form of a ſpear, or fork, with three teeth: whence the word.

TRIDENT, among mathematicians, is uſed for a kind of parabola, by which Des Cartes conſtructed equations of ſix dimenſions.

TRIEDROSTYLA, in natural hiſtory, the name of a genus of ſpars, in form of trigonal columns, adhering by one end to ſome ſolid body, and terminated at the other by a trigonal pyramid. See SPAR.

TRIEMIMERIS, a kind of cæſura in Latin verſe, wherein after the firſt foot of the verſe there remains an odd ſyllable, which helps to make up the next foot.

TRI-

Fig. 1. Triangles.

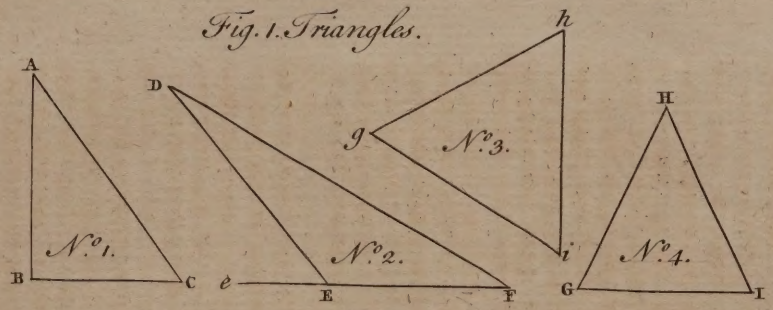


Fig. 2. Rectangular Trigonometry.

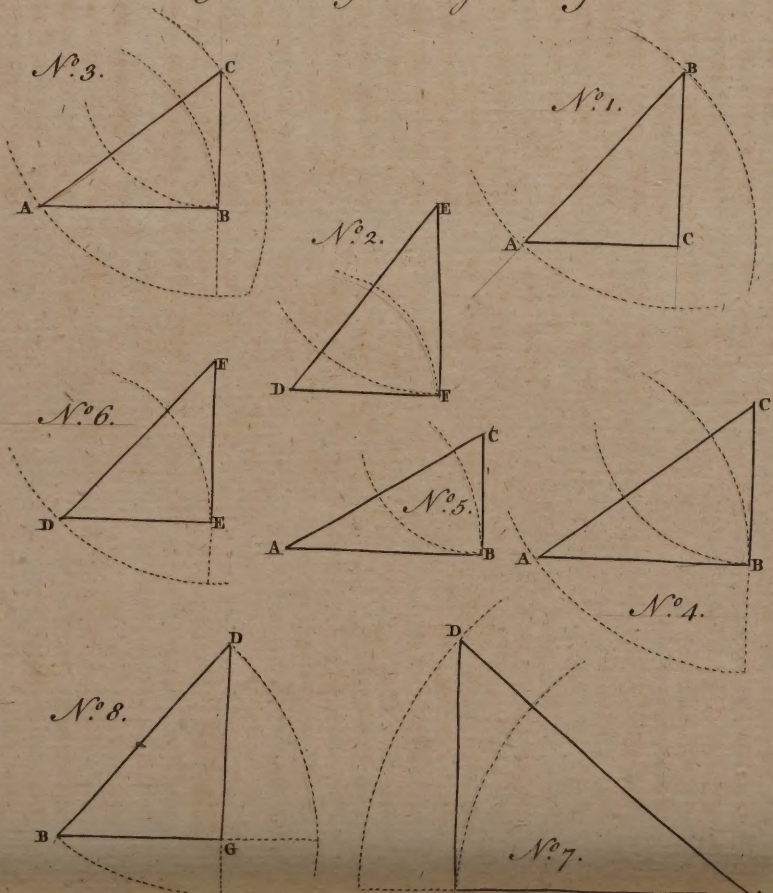
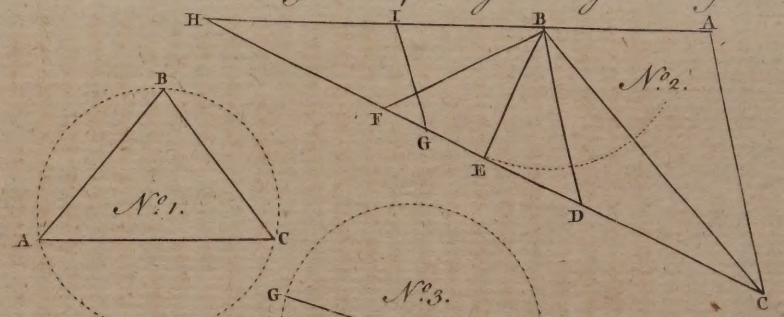


Fig. 3. Oblique-angled Trigonometry.



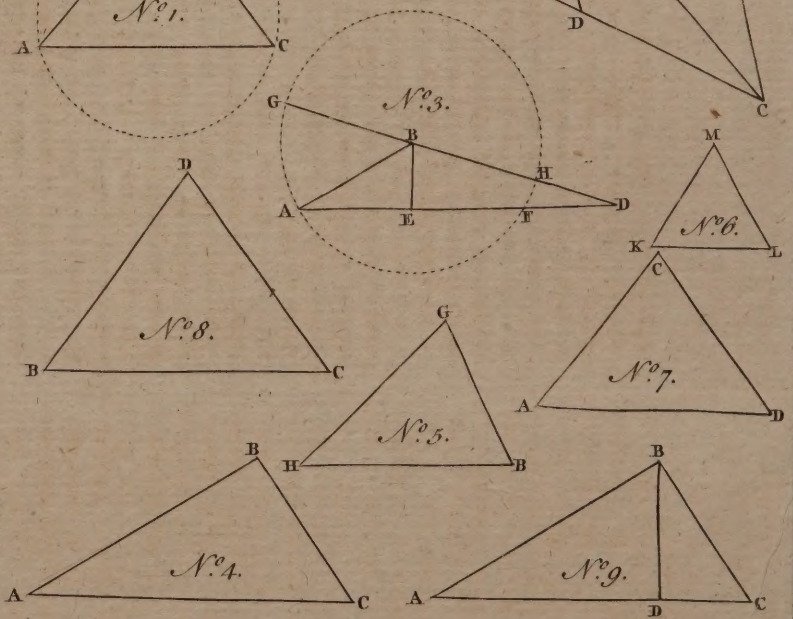
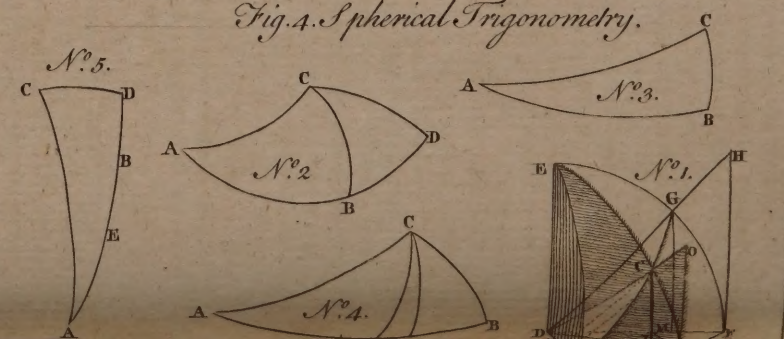


Fig. 4. Spherical Trigonometry.



TRIENNIAL, an epithet applied chiefly to offices or employments which laſt for three years.

TRIENS, in antiquity, a copper money of the value of one third of an as, which on one ſide bore a Janus's head, and on the other a water-rat.

TRIENTATIS, in botany, a genus of plants, whoſe flower is ſtellated and monopetalous, with the corolla divided into ſeven ovato-lanceolated ſegments; the ſtamina conſiſts of ſeven capillary filaments, inſerted into the ungues of the corolla, and topped with ſingle antheræ.

TRIFOLIUM, trefoil, in botany. See the article TREFOIL.

TRIGA, in antiquity, denotes a kind of carr, or chariot, drawn by three horſes; whence the name.

TRIGAMY, a third marriage, or the ſtate of a perſon who has been married three times. See MARRIAGE.

TRIGLOCHIN, in botany, a genus of plants, whoſe flower conſiſts of three oval-concave obtuſe petals, with ſix very ſhort filaments, and the ſame number of antheræ; the fruit is an oblong capſule, with three cells, each incloſing an oblong ſeed.

TRIGLYPTHS, in architecture, a ſort of ornaments repeated at equal intervals in the Doric freeze.

Each triglypth conſiſts of two entire gutters, or channels, cut to a right angle, called glyphes, and ſeparated by three interſtices, called, by Vitruvius, femora, from each other, as well as from two other half channels which are at the ſides.

TRIGON, τριγωνος, a triangle. See the article TRIANGLE

TRIGONELLA, fœnugreek, in botany. See FOENOGREEK.

TRIGONOMETRY, that part of geometry which teaches how to meaſure the ſides and angles of triangles. See TRIANGLE.

Trigonometry is either plane or ſpherical, according as the triangles are plane or ſpherical; of each whereof we ſhall treat in order.

Plane TRIGONOMETRY, or that which teaches the menſuration of plane triangles, is commonly divided into rectangular and oblique-angular.

I. And firſt of rectangular plane trigonometry; if in any right-angled triangle A B C (plate LXXXVIII. fig. 2. N° 1.) the hypothenuſe be made the radius, and with that a circle be deſcribed on the one end, A, as a center; then, it is plain, that B C will be the ſine of the angle B A C; and if, with the ſame diſtance, and on the end B as a center, a circle be deſcribed, it is plain that A C will be the ſign of the angle A B C; therefore, in general, if the hypothenuſe of a right-angled triangle be made the radius, the two legs will be the ſines of their oppoſite angles. See the articles SINE, RADIUS, &c.

Again, if in a right-angled triangle D E F (N° 2.) one of the legs, as D F, be made the radius, and on the extremity D (at one of the oblique angles, viz. that which is formed by the hypothenuſe and the leg made radius) as a center, a circle be deſcribed; it is plain that the other leg, E F, will be the tangent of the angle at D, and the hypothenuſe D E will be the ſecant of the ſame angle. The ſame way, making the leg E F the radius, and on the center E deſcribing a circle, the other leg D F will become the tangent of the angle at E, and the hypothenuſe D E the ſecant of the ſame. See TANGENT and SECANT.

The chord, ſine, tangent, &c. of any arch, or angle, in one circle, is proportionable to the chord, ſine, tangent, &c. of the ſame arch in any other circle: from which, and what has been ſaid above, the ſolutions of the ſeveral caſes of rectangular trigonometry naturally follow. See CHORD, ARCH, &c.

Since trigonometry conſiſts in determining angles and ſides from others given, there ariſes various caſes; which being ſeven in rectangular-trigonometry, are as follow:

Caſe I. The angles, and one of the legs, of a right-angled triangle be given, to find the other leg. Example: in the triangle A B C (N° 3.) right-angled at B, ſuppoſe the leg A B=86 equal parts; as feet, yards, miles, &c. and the angle A=33° 40′; required the other leg B C, in the ſame parts with A B.

1. Geometrically: Draw A B=86, from any line of equal parts; upon the point B, erect the perpendicular B C; and, laſtly, from the point A, draw the line A C, making with A B an angle of 33° 40′; and that line produced will meet B C in C, and ſo conſtitute the triangle. The length of B C may be found by taking it in your compaſſes, and applying it to the ſame line of equal parts that A B was taken from.

2. By calculation: Firſt, by making the hypothenuſe A C radius, the other two legs will be the ſines of their oppoſite angles, viz. A B the ſine of C, and C B the ſine of A.

Now, ſince the ſine, tangent, &c. of any arch in one circle, is proportionable to the ſine, tangent, &c. of the ſame arch in any other circle, it is plain the ſines of the angles A and C, in the circle deſcribed by the radius A C, muſt be proportional to the ſine of the ſame arches or angles, in the circle, that the table of artificial ſines, &c. was calculated for; ſo the proportion for finding B C will be

S, C : A B :: S, A : B C

i. e. As the ſine of the angle C in the tables, is to the length of A B (or ſine of C in the circle whoſe radius is A C) ſo is the ſine of the angle A in the tables, to the length of B C (or ſine of the ſame angle in the circle whoſe radius is A C.)

Now, the angle A being 33° 40′, the angle C must be 56° 20′; therefore, looking in the table of artificial fines, &c. for the fines of the two angles, and in the table of logarithms for the logarithm of 86 the given leg, we fhall find by proceeding according to the foregoing proportion, that the required leg BC, is 57.28; and the operation will ſtand as follows:

1.93450	AB	86
9.74380	S, A	33° 40′
11.67830		
9 92027	S, C	56° 20′
1.75803	BC	57.28

Secondly, making AB the radius, it is plain BC, the leg required, will be the tangent of the given angle A, and ſo the proportion for finding BC, when AB is made the radius, will be:

R: T, A:: AB: BC

i. e. as the radius of the tables, is to the tangent of the angle A in the ſame, ſo the length of BA, or radius in the ſcheme, to the length of BC or tangent of A in the ſcheme; therefore, looking in the tables for the parts given in the foregoing proportion, and proceeding with them according to that rule, we ſhall find BC to be 57.28 as before, and the operation will be as follows:

9.82352	T, A	33° 40′
1.93450	AB	86
11.75802		
10.00000	Rad.	90°
175802	BC	57.28

Laſtly, by making BC, the leg required, the radius, it is plain that AB will be the tangent of C, and the proportion for finding BC will be as follows:

T, C: R:: AB: BC

i. e. as the tangent of C	56° 20′	10.17648
is to radius ——	90°	10.00000
ſo is the length of AB	86	1.93450
		11.93450
		10.17648
to the length of BC	57.28	1.75802

Caſe II. The angles and one of the legs given, to find the hypoth. Example: in the triangle ABC (N° 4.) ſuppoſe AB 124, and the angle A 34° 28′; conſequently the angle C 53° 40′, required the hypothenuſe AC, in the ſame parts with AB.

1. Geometrically: this caſe is conſtructed after the ſame manner with the former; and the hypothenuſe, AC, is found, by taking its length in your compaſſes, and applying that to the ſame line of equal parts from which AB was taken.

2. By calculation: firſt, making AC the radius, we ſhall have the following proportion for finding AC, viz.

S, C: R:: AB: AC.

i. e. as the ſine of C	55° 40′	9.91686
is to radius ——	90°	10.00000
ſo is AB ——	124	2.09342
to AC —— ——	150.2	2.17656

Secondly, making AB the radius, we have this proportion, viz.

R: ſec. A:: AB: AC.

i. e. as the radius	90°	10.00000
to the ſecant of A	34° 20′	10.08314
ſo is AB ——	124	2.09342
to AC ——	150.2	2.17656

This may alſo be done without the help of the ſecants; for ſince R: ſec.:: Co-S.: R; therefore, the former proportion will become,

Co-S. A: R:: AB: AC.

i. e. as the co-ſine of A	34° 20′	9.91686
is to the radius —	90°	10.00000
ſo is AB —	124	2.09342
to AC ——	150.2	2.17656

Thirdly, making BC the radius, we have the following proportion, viz.

T, C: ſec. C:: AB: AC.

i. e. as the tangent of C	55° 40′	10.16558
is to ſec. C ——	55° 40′	10.24872
ſo is AB ——	124	2.09342
to AC — —	150.2	2.17656

This likewiſe may be done without the help of ſecants; for ſince T, : ſec.:: S, : R; therefore, th e former analogy will be reduced to this, viz.

S, C: R:: AB: AC

where no ſecants do appear, and it coincides with that of the firſt ſuppoſition of this caſe, ſo we ſhall not repeat the operation.

Caſe III. The angles and hypothenuſe given, to find either of the legs. Example: in the triangle ABC (N° 4.) ſuppoſe the hypothenuſe AC=146, and the angle A=36° 25′; conſequently the angle C=53° 35′; required the leg AB.

1. Geometrically: draw the line AB at pleaſure, and make the angle BAC equal to 36° 25′; then take AC equal to 146 from any line equal parts; laſtly, from the point C, let fall the perpendicular CB, on the line AB. So the triangle is conſtructed, and AB may be meaſured from the line of equal parts.

2. By calculation: firſt, making AC the radius, we ſhall have the following proportion, viz.

R: S, C:: AC: AB.

i. e. as radius ——	90°	10.00000
to the ſine of C —	53° 35′	9.90565
ſo is AC ——	146	2.16435
to AB ——	117.5	2.07000

Secondly, making AB the radius, we have the following analogy, viz.

Sec.

Sec. A : R :: AC : AB.

i. e. as the ſecant of A	36° 25′	10.09435
is to radius —	90°	10.00000
ſo is AC ——	146	2.16435
to AB ——	117.5	2.07000

This may alſo be done without the help of ſecants; for ſince ſec. : R :: R Co-S, the former proportion may be reduced to this, viz.

R : Co-S. A :: AC : AB

which is the ſame with the proportion in the firſt ſuppoſition.

Thirdly, by ſuppoſing BC the radius, we have the following proportion, viz.

Sec C : T, C :: AC : AB.

i.e. as the ſecant of C	53° 35′	10.22647
is to the tangent of C	53° 35′	10.13212
ſo is AC ——	146	2.16435
to AB ——	117.5	2.07000

Caſe IV. The two legs being given, to find the angles. Example: in the triangle ABC (N° 5.) ſuppoſe AB 94, and BC 56; required the angles A and C.

1. Geometrically: draw AB equal to 94, from any line of equal parts, then from the point B raiſe BC perpendicular to AB, and take BC, from the former line of equal parts equal to 56; laſtly, join the parts A and C with the ſtreight line AC, ſo the triangle is conſtructed, and the angles may be meaſured by a line of chords. See the articles SCALE and SECTOR.

2. By calculation: firſt, ſuppoſing AB the radius, we have this analogy, viz.

AB : BC :: R : T, A.

i. e. as AB	94	1.97313
is to BC	56	1.74819
ſo is the radius	90°	10.00000
to the tangent of A	30° 47′	9.77506

Secondly, making BC the radius, we have this proportion, viz.

BC : BA :: R : T, C.

i. e. as BC	56	1.74819
is to AB	94	1.97313
ſo is the radius	90°	10.00000
to the tangent of C	59° 13′	10.22494

Caſe V. The hypothenuſe and one of the legs given, to find the angle.

Example: in the triangle DEF, (N° 6.) ſuppoſe the leg DE = 83, and the hypothenuſe DF = 126; required the angles D and F.

1. Geometrically: draw the line DE = 83. from any line of equal parts; and, from the point E, raiſe the perpendicular EF: then take the length of DF = 126, from the ſame line of equal parts; and ſetting one foot of your compaſſes in D, with the other croſs the perpendicular EF in E; laſtly, join D and F; and the triangle being thus conſtructed, the angles may be meaſured by a line of chords.

2. By calculation: firſt, making DF the radius, we ſhall have this proportion, viz.

DF : DE :: R : S, F.

i. e. as DF	126	2.10037
is to DE	83	1.91908
ſo is the radius	90°	10.00000
to the ſine of F	41° 12′	9.81871

Secondly, by ſuppoſing DE the radius, we have the following analogy, viz.

DE : DF :: R : Sec. D.

i.e. as DE	83	1.91908
is to DF	126	2.10037
ſo is radius	90°	10.00000
to the ſecant of D	48° 48′	10.18129

This may be done without the help of ſecants; for ſince R : ſec. :: Co-S, : R, the foregoing analogy will become this, viz.

DF : DE :: R : Co-S, D.

which gives the ſame anſwer, with that deduced from the firſt ſuppoſition.

Caſe VI. The two legs being given, to find the hypothenuſe.

Example: In the triangle ABD, (N° 7.) ſuppoſe the leg AB = 64, and BD = 56: required the hypothenuſe,

1. Geometrically: the conſtruction of this caſe is performed the ſame way as in the fourth caſe, and the length of the hypothenuſe is found by taking it in your compaſſes, and applying it to the ſame line of equal parts, that the two legs were taken from.

2. By calculation: this caſe being a compound of the fourth and ſecond caſes, we muſt firſt find the angles by the fourth, thus:

AB : DB :: R : T, A.

i. e. as the leg AB	64	1.80618
is to the leg DB	56	1.74819
ſo is the radius	90	10.00000
to the tangent of A	41° 11′	9.94201

Then by the ſecond caſe we find the hypothenuſe required thus:

S, A : R :: BD : AD,

i. e. as the ſine A	41° 12′	9.81854
is to the radius	90°	10.00000
ſo is the leg BD	56	1.74819
to the hypoth. AD	85.05	1.92965

This caſe may alſo be ſolved after the following manner, viz.

From twice the log. of the greater ſide AB	3.61236
ſubtract the log. of the leſſer ſide BD —	1.74819
and there remains — — —	1.86417
the logarithm of 73.15; to which adding	
the leſſer ſide BD, we ſhall have ——	189.15
whoſe log. is — — — —	2.11093
to which add the log. of the leſſer ſide BD	1.74819
and the ſum will be — — —	3.85912
the half of which is — — —	1.92956

the

the logarithm of the hypothenuſe required. See LOGARITHM.

Or it may be done by adding the ſquare of the ſides together, and taking the logarithm of that ſum, the half of which is the logarithm of the hypothenuſe required: thus, in the preſent caſe, the

ſquare of A B (64) is — — —	4096
the ſquare of B D (56) is — —	3136
the ſum of theſe ſquares is — —	7232
the log. of which is — — —	3.85926
the half of which is — — —	1.92963

= to the logarithm of 85.05, the length of the hypothenuſe required.

Caſe VII. The hypothenuſe and one of the legs being given, to find the other leg.

Example: in the triangle B G D, (N° 8.) ſuppoſe the leg B G = 87, and the hypothenuſe B D = 142; required the leg D G.

1. Geometrically: the conſtruction here is the ſame as in caſe V. the ſame things being given; and the leg D G is found by taking its length in your compaſſes, and applying that to the ſame line of equal parts the others were taken from.

2. By calculation: the ſolution of this caſe depends upon the 1ſt and 5th; and firſt we muſt find the oblique angles by caſe 5th, thus:

D B : B G :: R : S, D.

i. e. as the hypoth. D B	142	2.15229
is to the leg B G	87	1.93952
ſo is radius	90°	10.00000
to the ſine of D	37° 47′	9.78723

Then by caſe 1ſt, we find the leg D G required, thus:

R : S, B :: B D : D G,

i. e. as radius	90°	10.00000
is to the ſine of B	52° 13′	9.89781
ſo is the hypoth. D B	142	2.15229
to the leg D G	112.2	2.05010

The leg D G may be found in the following manner, viz.

To the log. of the ſum of the hypothenuſe and given leg, viz. 229 } add the log. of their difference, viz. 55	2.35984 1.74036
and their ſum is — —	4.10020
the half of that is — —	2.05010

the log. of 112.2, the leg required.

Or it may be done by taking the ſquare of the given leg from the ſquare of the hypothenuſe, and the ſquare root of the remainder is the leg required: thus, in the preſent caſe.

The ſquare of the hypothenuſe (142) is	20164
The ſquare of the leg B G (87) is	7569
Their difference is — —	12595
Whoſe logarithm is — —	4.10020
The half of which is — —	2.05010

which anſwers to the natural number 112.2, the leg required.

Thus have we gone through the ſeven caſes of right-angled plane-trigonometry; from which we may obſerve; 1. That to find a ſide, when the angles are given, any ſide may be made the radius. 2. To find an angle, one of the given ſides muſt of neceſſity be made the radius.

II. We now proceed to oblique angled plane-trigonometry, in which there are ſix caſes: but before we ſhew their ſolution, it will be proper to premiſe the following theorems.

Theorem 1. In any triangle A B C (fig. 3. N°1.) the ſides are proportional to the ſines of the oppoſite angles: thus, in the triangle A B C, A B : B C :: S, C : S, A, and A B : A C :: S, C : S, B: alſo A C : B C :: S, B : S, A.

Demonſtration: let the triangle A B C be inſcribed in a circle; then, it is plain (from the property of the circle) that the half of each ſide is the ſine of its oppoſite angle: but the ſines of theſe angles in tabular parts, are proportioned to the ſines of the ſame in any other meaſure; therefore, in the triangle A B C, the ſines of the angles will be as the halves of their oppoſite ſides; and ſince the halves are as the wholes, it follows, that the ſines of the angles are as their oppoſite ſides; i. e. S, C : S, A :: A B : B C, &c.

Theor. 2. In any plane triangle, as A B C (N° 2.) the ſum of the ſides, A B and B C, is to the difference of theſe ſides, as the tangent of half the ſum of the angles B A C, A B C, at the baſe, is to the tangent of half the difference of theſe angles.

Demonſ. Produce A B; and make B H equal to B C; join H C, and from B let fall the perpendicular B E; through B draw B D parallel to A C, and make H F equal to C D, and join B F; alſo make B I equal to B A, and draw I G parallel to B D or A C.

Then it is plain that A H will be the ſum, and H I the difference of the ſides A B and B C; and ſince H B is equal to B C, and B E perpendicular to H C, therefore H E is equal to E C; and B D being parallel to A C and I G, and A B equal to B I, therefore C D or H F is equal to G D, and conſequently H G is equal to F D, and half H G is equal to half F D or E D. Again, ſince H B is equal to B C, and B E perpendicular to H C, therefore the angle E B C is half the angle H B C; but the angle H B C is equal to the ſum of the angles A and C, conſequently the angle E B C is equal to half the ſum of the angles A and C. Alſo ſince H B is equal to B C, and H F equal to C D, and the included angles B H F, B C D equal, it follows that the angle H B F is equal to the angle D B C, which is equal to B C A; and ſince H B D is equal to the angle A, and H B F equal to B C A, therefore F B D is the difference, and E B D half the difference of the two angles A and B C A; ſo making E B the radius, it is plain E C is the tangent of half the ſum,

and ED the tangent of half the difference of the two angles at the base.

Now, IG being parallel to AC, the triangles HIG and HAC will be equiangular; consequently AH:IH::CH:GH; but the wholes are as their halves, therefore AH:IH::½CH:½GH; and since ½CH is equal to EC, and ½GH equal to ½FD=ED; therefore, AH:IH::EC::ED. Now, AH is the sum, and IH the difference of the sides; also EC is the tangent of half the sum, and ED the tangent of half the difference of the two angles at the base; consequently, in any triangle, as the sum of the sides is to their difference, so is the tangent of half the sum of the angles at the base, to the tangent of half their difference.

Theorem 3. If to half the sum of two quantities be added half their difference, the sum will be the greater of them; and if from half their sum be subtracted half their difference, the remainder will be the least of them.

Suppose the greater quantity to be $x=8$, and the lesser $z=6$; then is their sum 14, and difference 2: wherefore, adding $\frac{14}{2}=7$ to $\frac{2}{2}=1$, we get 8 the greatest of the two quantities; and, in the same manner, $\frac{14}{2}-\frac{2}{2}=7-1=6$, the least of the two quantities.

Theor. 4. In any right-lined triangle, ABD (N° 3.) the base AD is to the sum of the sides AB and BD, as the difference of the sides is to the difference of the segments of the base made by the perpendicular BE, viz. the difference between AE and ED.

Demon. Produce EB till BG be equal to BA the lesser leg; and on B as a center, with the distance BA or BG, describe the circle AGHF, which will cut BD and AD in the points H and F; then it is plain GD is the sum, and HD the difference of the sides; also since AE is equal to EF, therefore FD is the difference of the segments of the base; but AD:GD::HD:FD; therefore the base is to the sum of the sides, &c. as was to be proved.

Having established these preliminary theorems, we shall now proceed to the solution of the six cases of oblique-angled plane trigonometry.

Case I. In any oblique-angled plane triangle, two sides and an angle opposite to one of them being given, to find the angle opposite to the other. Example: in the triangle ABC (N° 4.) suppose AB=156, BC=84, and the angle C (opposite to AB) =56° 30′; required the angle A, opposite to BC.

1. Geometrically: draw the line AC, and at any point of it, suppose C, make the angle C=56° 30′; then take CB=84, and with the length of 156=AB taken in your compasses from the same scale of equal parts, fixing one point in B, with the other cross AC in A. Lastly, join A and B; so the triangle is constructed, and the required angle A may be measured by a line of chords.

2. By calculation: we have (by theor. 1.) the following proportion for finding the angle A, viz.

AB:BC::S,C:S,A.

i.e. as AB ——	156	2.19312
to BC ——	84	1.92428
so is S, C ——	56° 30′	9.92111
to S, A ——	26° 41′	9.65227

Case II. The angles, and a side opposite to one of them, being given, to find a side opposite to another. Example: in the triangle HBG (N° 5.) suppose the angle H 46° 15′, and the angle B 54° 22′; consequently the angle G 79° 23′, and the leg HB 125, required HG.

1. Geometrically: draw HB 125, from any line of equal parts, and make the angle H 46° 15′, and B 54° 22′; then produce the lines HG and BG till they meet one another in the point G; so the triangle is constructed, and HG is measured by taking its length in your compasses, and applying it to the same line of equal parts that HB was taken from.

2. By calculation: by the first of the preceding theorems, we have this analogy for finding HG, viz.

S,G:HB::S,B:HG.

i.e. as the sine of G	79° 23′	9.99250
is to the leg HB	125	2.09691
so is the sine of B	54° 22′	9.90996
to the leg HG	103.4	2.01437

Case III. Two sides and an angle opposite to one of them given, to find the third side. Example: in the triangle KLM (N° 6.) suppose the side CL 126 equal parts, and KM 130 of these parts, and the angle L (opposite to KM) 63° 20′, required the side ML.

1. Geometrically: the construction of this case is the same with that in Case I. (there being the same things given in both) and the leg ML may be measured by applying it to the same line of equal parts that the other two were taken from.

2. By calculation: the solution of this case depends upon the two preceding ones; and, first, we must find the other two angles by Case I. thus:

MK:S,L::KL:S,M.

i.e. as the side MK	130	2.11394
to the sine of L —	63° 20′	9.95116
so is the side KL	126	2.10037
to the sine of M	60° 1′	9.93759

Then by Case II. we have the required leg ML, thus:

S.L:S.K::MK:ML.

i.e. as the sine of L	63° 20′	9.95116
to the sine of K —	53° 39′	9.90602
so is MK ——	130	2.11394
to ML — — —	117.2	2.06850

Case IV. Two sides and the contained angle being given, to find the other two angles. Example:

in the triangle ACD (N° 7.) ſuppoſe AC=103, AD=126, and the angle A=54° 30′; required the angles C and D.

1. Geometrically: draw AD=126, and make the angle A=54° 30′; then ſet off 103 equal parts from A to C. Laſtly, join C and D; and ſo the triangle is conſtructed, and the angles C and D may be meaſured by a line of chords.

2. By calculation: the ſolution of this caſe depends upon the ſecond and third of the preceding theorems; and firſt we muſt find the ſum and difference of the ſides, and half the ſum of the unknown angles, thus:

The leg AD is — —	126
the leg AC is —— ——	130
their ſum is — — —	229
and their difference is ——	23
the ſum of the three angles A, D, and C, is ——	180°
the angle A is — —	54° 30′
ſo the ſum of the angles C and D will be —	125° 30′
and half their ſum is ——	62° 45′

Then by theor. 2. we have the following proportion, viz.

As the ſum of the ſides AD and AC=229 —— ——		2.35984
to their difference	23	1.36173
ſo is the tangent of half the ſum of the unknown angles C and D	62° 45′	10.28816
to tangent of half their difference —	11° 2′	9.29005

Now, having half the ſum and half the difference of the two unknown angles C and D, we find the quantity of each of them by theorem 3. thus:

To half the ſum of the angles C and D, viz. ——	62° 45′
add half their difference, viz.	11° 02′
and the ſum is the greater ang. C	73° 47′
Again, from half their ſum, viz.	62° 45′
take half their difference, viz.	11° 02′
And there will remain the leſſer angle D ——	=51° 43′

N.B. The greater angle is always that ſubtended by the greater ſide; thus, in the preſent caſe, the greater angle C, is ſubtended by the greater ſide AD; and the leſſer angle D, is ſubtended by the leſſer ſide AC.

Caſe V. Two ſides and the contained angle being given, to find the third ſide. Example: in the triangle BCD (N° 8.) ſuppoſe BC=154, BD=133, and the angle B=56° 03′; required the ſide CD.

1. Geometrically: the conſtruction of this caſe is the ſame with that of the laſt, and the length of DC is found by taking its length in your compaſſes, and applying it to the ſame line of equal parts that the two legs are taken from.

2. By calculation: the ſolution of this caſe depends upon the ſecond and fourth; and firſt we muſt find the angles by the laſt caſe; thus:

As the ſum of the ſides BD and BC 287 —— ——		2.45788
is to their difference 21 ——		1.32222
ſo is the tangent of half the ſum of the angles D and C —	61° 58′	10.27372
to the tangent of half their difference 7,50 ——		9.13806

So by theorem 3. we have the angles D and C, thus:

To half the ſum of the angles D and C ——	61° 58′
add half their difference ——	7° 50′
and the ſum is the greater angle D	69° 48′
Alſo, from half the ſum ——	61° 58′
take half the difference — —	7° 50′
and there remains the leſſer angle C —— ——	54° 08′

Then by Caſe II. we have the following analogy for finding DC the leg requird, viz.

S, C : BD :: S, B : DC.

i. e. As the ſine of C	54° 08′	9.90869
To BD ——	133	2.12385
So is the ſine of B	56° 03′	9.91883
To DC ——	136.2	2.13399

Caſe VI. Three ſides being given, to find the angles.

Example: In the triangle ABC (No 9.) ſuppoſe AB=156, AC=185.7, and BC=84; required the angles A, B, and C.

1. Geometrically: Make AC=185.7, from any line of equal parts; and from the ſame line taking 156=AB in your compaſſes, fix one foot of them in A, and with another ſweep an arch; then take 84=BC in your compaſſes, and fixing one foot in C, with another ſweep an arch, which will croſs the former in B: laſtly, join the points B and A, and B and C; ſo the triangle will be conſtructed, and the angles may be meaſured by a line of chords.

2. By calculation: Let fall the perpendicular, BD, from the vertex B, upon the baſe AC; which will divide the baſe into two ſegments AD and DC, the length whereof may be found by theorem 4, thus:

As the baſe AC — 185.7 —	2.26893
To the ſum of the ſides AB and BC 240 —— ——	2.38031
So is the diff. of the ſides 72 ——	1.83733
To the diff. of the ſegments of the baſe 93 —— — —	1.96871

And having the ſum of the ſegments, viz. the

whole base, and their difference, we find the segments themselves, by theorem 3, thus:

To half the sum of the segments — —	92.8
And half their difference — —	46.5
And the sum is the greater segment AD	139.3
Also from half the sum of the segment —	92.8
Take half their difference — —	46.5
The remainder is the lesser segment DC	46.3

Now the triangle ABC is divided by the perpendicular DB, into two right-angled triangles, ADB, and DBC; in the first of which are given the hypothenuse AB = 156, and the base AD = 139.3, to find the oblique angles, for which we have (by Case V. of rectangular trigonometry) the following analogy, viz.

As AB — — —	156	2.19312
To AD — —	139.3	2.14395
So is the radius — —	90°	10.00000
To the co-sine of the angle A	26° 40′	9.95038

Also the angle C is found by the same case, thus:

As BC — —	44 — —	1.92428
To CD — —	46.3 — —	1.66558
So is the radius	90° — —	10.00000
To the co-sine of C	56° 30′	9.74130

Having found the two angles A and C, we have the third, B, by taking the sum of the other two from 180, thus:

The sum of all the three angles is —	180°
The sum of A and C is — —	83° 10′
The angle B is — —	96° 50′

All the proportions used for the solutions of the several cases in plain trigonometry, may be performed by the scale and compass. On the scale there are several logarithmic line, viz. one of numbers, another of sines, and one of tangents, &c. See the articles SCALE.

And the way of working a proportion by these is this, viz. extend your compasses from the first term of your proportion, found on the scale, to the second, and with that extent, fixing one foot in the third term, the other will reach the fourth term required.

Spherical TRIGONOMETRY, is the art whereby, from three given parts of a spherical triangle, we discover the rest; and, like plane trigonometry, is either right-angled, or oblique-angled. But before we give the analogies for the solution of the several cases in either, it will be proper to premise the following theorems.

Theorem 1. In all right-angled spherical triangles, the sine of the hypothenuse : radius : : sine of a leg : sine of its opposite angle. And the sine of a leg : radius : : tangent of the other leg : tangent of its opposite angle.

Demonstration: Let EDAFG (fig. 4. N° 1.) represent the eighth part of a sphere, where the quadrantal planes EDFG, EDBC, are both perpendicular to the quadrantal plane ADFB; and the quadrantal plane ADGC is perpendicular to the plane EDFG; and the spherical triangle ABC is right-angled at B, where CA is the hypothenuse, and BA, BC, are the legs.

To the arches GF, CB, draw the tangents HF, OB, and the sines GM, CI, on the radius DF, DB; also draw BL the sine of the arch AB, and CK the sine of AC; and then join IK and OL. Now HF, OB, GM, CI, are all perpendicular to the plane ADFB. And HD, GK, OL, lie all in the same plane ADGC. Also FD, IK, BL, lie all in the same plane ADGC. Therefore, the right-angled triangles HFD, CIK, ODL, having the equal angles HDF, CKI, OLB, are similar. And CK : DG : : CI : GM; that is, as the sine of the hypothenuse : rad. : : sine of a leg : sine of its opposite angle. For GM is the sine of the arc GF, which measures the angle CAB. Also, LB : DF : : BO : FH; that is, as the sine of a leg : rad. : : tang. of the other leg : tang. of its opposite angle. Q. E. D.

Hence it follows, that the sines of the angles of any oblique spherical triangle ACD (N° 2.) are to one another, directly, as the sines of the opposite sides. Hence it also follows, that, in right-angled spherical triangles, having the same perpendicular, the sines of the bases will be to each other, inversely, as the tangents of the angles at the bases.

Theorem 2. In the right-angled spherical triangle ABC (N° 3.) it will be, as radius is to the co-sine of one leg, so is the co-sine of the other leg to the co-sine of the hypothenuse.

Hence, if two right-angled spherical triangles ABC, CBD (N° 2.) have the same perpendicular BC, the co-sines of their hypothenuses will be to each other, directly, as the co-sines of their bases.

Theorem 3. In any spherical triangle it will be, as radius is to the sine of either angle, so is the co-sine of the adjacent leg to the co-sine of the opposite angle.

Hence, in right-angled spherical triangles, having the same perpendicular, the co-sines of the angles at the base will be to each other, directly, as the sines of the vertical angles.

Theorem 4. In any right-angled spherical triangle it will be, as radius is to the co-sine of the hypothenuse, so is the tangent of either angle to the co-tangent of the other angle.

As the sum of the sines of two unequal arches is to their difference, so is the tangent of half the sum of those arches to the tangent of half their difference: and, as the sum of the co-sines is to their difference, so is the co-tangent of half the sum of the arches to the tangent of half the difference of the same arches.

Theorem 5. In any spherical triangle ABC (N°

(N° 4 and 5.) it will be, as the co-tangent of half the sum of the two sides is to the tangent of half their difference, so is the co-tangent of half the base to the tangent of the distance (DE) of the perpendicular from the middle of the base.

Since the last proportion, by permutation, becomes co-tang. $\frac{AC+BC}{2}$: co-tang. AE :: tang. $\frac{AC-BC}{2}$: tang. DE, and as the tangents of any two arches are, inversely, as their co-tangents; it follows, therefore, that tang. AE : tang. $\frac{AC+BC}{2}$ :: tang. $\frac{AC-BC}{2}$: tang. DE; or, that the tangent of half the base is to the tangent of half the sum of the sides, as the tangent of half the difference of the sides to the tangent of the distance of the perpendicular from the middle of the base.

Theorem 6. In any spherical triangle ABC (N° 4.) it will be, as the co-tangent of half the sum of the angles at the base, is to the tangent of half their difference, so is the tangent of half the vertical angle to the tangent of the angle which the perpendicular CD makes with the line CF bisecting the vertical angle.

The Solution of the Cases of right-angled spherical Triangles, (fig. 4. N° 3.)

Case	Given	Sought	Solution
1	The hyp. AC and one angle A	The opposite leg BC	As radius : sine hyp. AC :: sine A : sine BC (by the former part of theor. 1.)
2	The hyp. AC and one angle A	The adjacent leg AB	As radius : co-sine of A :: tang. AC : tang. AB (by the latter part of theor. 1.)
3	The hyp. AC and one angle A	The other angle C	As radius : co-sine of AC :: tang. A : co-tang. C (by theorem 4.)
4	The hyp. AC and one leg AB	The other leg BC	As co-sine AB : radius :: co-sine AC : co-sine BC (by theorem 2.)
5	The hyp. AC and one leg AB	The opposite angle C	As sine AC : radius :: sine AB : sine C (by the former part of theorem 1.)
6	The hyp. AC and one leg AB	The adjacent angle A	As tang. AC : tang. AB :: radius : co-sine A (by theorem 1.)
7	One leg AB and the adjacent angle A	The other leg BC	As radius : sine AB :: tangent A : tangent BC (by theorem 4.)
8	One leg AB and the adjacent angle A	The opposite angle C	As radius : sine A :: co-sine of AB : co-sine of C (by theorem 3.)
9	One leg AB and the adjacent angle A	The hyp. AC	As co sine of A : radius :: tang. AB : tang. AC (by theorem 1.)
10	One leg BC and the opposite angle A	The other leg AB	As tang. A : tang. BC :: radius : sine AB (by theorem 4.)
11	One leg BC and the opposite angle A	The adjacent angle C	As co-sine BC : radius :: co-sine of A : sin. C (by theorem 3.)
12	One leg BC and the opposite angle A	The hyp. AC	As sin. A : sin. BC :: radius : sin. AC (by theorem 1.)
13	Both legs AB and BC	The hyp. AC	As radius : co-sine AB :: co-sine BC : co-sine AC (by theorem 2.)
14	Both legs AB and BC	An angle, suppose A	As sine AB : radius :: tang. BC : tang. A (by theorem 4.)
15	Both angles A and C	A leg, suppose AB	As sine A : co-sine C :: radius : co-sine AB (by theorem 3.)
16	Both angles A and C	The hyp. AC	As tang. A : co-sine C :: radius : co-sine AC (by theorem 4.)

Note. The 10th, 11th, and 12th cases are ambiguous; since it cannot be determined by the data, whether AB, C, and AC, be greater or less than 90 degrees each.

The Solution of the Caſes of oblique ſpherical Triangles, (fig. 4. N° 4 and 5.)

Caſe	Given	Sought	Solution
1	Two ſides A C, B C, and an angle A oppoſite to one of them	The angle B oppoſite to the other	As ſine B C : ſine A : : ſine A C : ſine B (by theor. 1.) Note, this caſe is ambiguous when B C is leſs than A C; ſince it cannot be determined from the data whether B be acute or obtuſe.
2	Two ſides A C, B C, and an angle A oppoſite to one of them.	The included angle A C A	Upon A B produced (if need be) let fall the perpendicular C D: then (by theor. 4.) rad.: co-ſine A C : : tang. A : co-tang. A C D; but (by theorem 1.) as tang. B C: tang. A C : : co-ſine A C D : co-ſine B C D. Whence A C B = A C D ± B C D is known.
3	Two ſides A C, B C, and an angle oppoſite to one of them	The other ſide A B	As rad. : co-ſine A : : tang. A C : tang. A D (by theor. 1.) and (by theor. 2.) as co-ſine A C : co-ſine B C : : co-ſine A D : co-ſine B D. Note, this and the laſt caſe are both ambiguous when the firſt is ſo.
4	Two ſides A C, A B, and the included angle A.	The other ſide B C	As rad. : co-ſine A : : tang. A C : tang. A D (by theor. 1.) whence B D is alſo known : then (by theor. 2.) as co-ſine A D : co-ſine B D : : co-ſine A C : co-ſine B C.
5	Two ſides A C, A B, and the included angle A	Either of the other angles, ſuppoſe B	As rad. : co-ſine A : : tang. A C : tang. A D (by theorem 1.) whence B D is known : then (by theor. 4.) is ſine B D : ſine A D : : tang. A : tang. B.
6	Two angles A, A C B, and the ſide A C betwixt them	The other angle B	As rad. : co-ſine A C : : tang. A : co-tang. A C D (by theor. 4.) whence B C D is alſo known : then (by theor. 3.) as ſine A C D : ſine B C D : : co-ſine A : co-ſine B.
7	Two angles A, A C B, and the ſide A C betwixt them	Either of the other ſides, ſuppoſe B C	As rad. : co-ſine A C : : tang. A : co-tang. A C D (by theo 4.) whence B C D is alſo known : then, as co-ſine B C D : co-ſine A C D : : tang. A C tang. B C (by theor. 1.)
8	Two angles A, B, and a ſide A C oppoſite to one of them	The ſide B C oppoſite the other	As ſine B : ſine A C : : ſine A : ſine B C (by theorem 1.)
9	Two angles A, B, and a ſide A C oppoſite to one of them	The ſide A B betwixt them	As rad. : co-ſine A : : tang. A C : tan. A D (by theor. 1.) and as : tang. B : tang. A : : ſine A D : ſine B D (by theor. 4.) whence A B is alſo known.
10	Two angles A, B and a ſide A C oppoſite to one of them	The other angle A C B	As rad. : co-ſine A C : : tang. A : co-tang. A C D (by theor. 4.) and as co-ſine A : co-ſine B : : ſine A C D : ſine B C D (by theor. 3.) whence A C B is alſo known.

Case	Given	Sought	Solution
11	All the three sides A B, A C, and B C	An angle, suppose A	As tang. $\frac{1}{2}$ A B : tang. $\frac{AC+BC}{2}$: : tang. $\frac{AC-BC}{2}$: tang. D E, the distance of the perpendicular from the middle of the base (by theorem 6.) whence A D is known: then, as tang. A C : tang. A D : : rad. : co-sine A (by theorem 1.)
12	All the three angles A, B, and A C B	A side, suppose A C	As co-tang. $\frac{ABC+A}{2}$: tang. $\frac{ABC-A}{2}$: : tang. $\frac{ACB}{2}$: tang. of the angle included by the perpendicular and a line bisecting the vertical angles; whence A C D is also known: then (by theor. 5.) tang. A : co-tang. A C D : rad. co-sine A C.

Note, in letting fall your perpendicular, let it always be from the end of a given side, and opposite to a given angle.

TRILLION, in arithmetic, a billion of billions. See NUMERATION.

TRILLIUM, in botany, a genus of plants, whose flower consists of three oval petals, and six subulated filaments, terminated with oblong antheræ, which are the length of the filaments; the fruit is a roundish trilocular berry, containing a number of roundish seeds.

TRILLO, in music, the same with cadence. See CADENCE.

TRIM *of a Ship*, her best posture, proportion of ballast, and hanging of her yards, &c. for sailing.

To find the trim of a ship, is to find the best way of making her sail swiftly, or how she will sail best. This is done by easing of her masts and shrowds; some ships sailing much better when they are slack, than when they are taut or fast: but this depends much upon experience and judgment, and the several trials and observations which the commander and other officers may make on board.

TRIMMERS, in architecture, pieces of timber framed at right-angles to the joints, against the ways for chimneys, and well-holes for stairs.

TRINGLE, in architecture, a name common to several little square members or ornaments, as reglets, listels, and plat-bands.

TRINGLE, is more particularly used for a little member fixed exactly over every triglyph, under the plat-band of the architrave, from whence the guttæ or pendant-drops hang down.

TRINITARIANS, those who are orthodox and believe in the Trinity; those who do not believe therein, being called Antitrinitarians. See ANTITRINITARIANS.

TRINITARIANS, also denote an order of religious, instituted at Rome in the year 1198, under the pontificate of Innocent III. the founders whereof were John de Matha, and Felix de Valois. His holiness gave them permission to establish this order for the deliverance of captives, who groaned under the tyranny of the infidels; he gave them, as a habit, a white gown ornamented with a red and blue cross.

TRINITY, *Trinitas*, in theology, the ineffable mystery of three persons in one God; Father, Son, and Holy Spirit.

The doctrine of the Trinity, as professed in the Christian church, is as follows: that there is but one God in three distinct persons, Father, Son, and Holy Ghost; *person* signifying the same as *essence*, with a particular manner of subsistence, which the Greek fathers call *hypostasis*, taking it for the incommunicable property that makes a person.

The Father, Son, and Holy Ghost, are believed to be three distinct persons in the divine nature, because the scriptures, in speaking of these three, distinguish them from one another, as we use in common speech, to distinguish three several persons. There are many instances to this purpose, particularly the form of administring the sacrament of baptism, which runs in the name of the Father, the Son, and the Holy Ghost; and that solemn benediction with which St. Paul ends his second Epistle to the Corinthians, "The grace of our Lord Jesus Christ

Chriſt, &c." and the three witneſſes in heaven, mentioned by St. John. Each of theſe three perſons are affirmed to be God, becauſe the names, properties, and operations of God are, in the Holy Scriptures, attributed to each of them.

The divinity of the Father is indiſputed; that of the Son is proved from the following texts, among many others: St. John ſays, "The Word was God;" St. Paul, "That God was manifeſted in the fleſh; that Chriſt is over all, God bleſſed for ever." Eternity is attributed to the Son; "The Son hath life in himſelf:" perfection of knowledge: "As the Father knoweth me, ſo know I the Father." And we are commanded to "Honour the Son as we honour the Father."

The divinity of the Holy Ghoſt reſts upon the following proofs, among others: Lying to the Holy Ghoſt, is called "Lying to God;" becauſe Chriſtians are the temples of the Holy Ghoſt, they are ſaid to be the "Temples of God." "His teaching all things; his guiding into all truth; his telling things to come; his ſearching all things, even the deep things of God, &c." are adduced as plain characters of his divinity. Beſides, he is joined with God the Father, as an object of faith and worſhip, in baptiſm, and the apoſtolical benediction.

Many of the heathens ſeem to have had a notion of the Trinity in the Godhead; Plato and his followers ſpeak of it in ſuch terms, that the primitive fathers have been accuſed of borrowing the doctrine itſelf from the Platonic ſchool. This point is treated at large in Cudworth's Intellectual Syſtem.

TRINITY-SUNDAY, a feſtival of the Chriſtian church, obſerved on the Sunday next after Whitſunday, in honour of the holy and undivided Trinity. The obſervation of this feſtival was firſt enjoined in the council of Arles, anno 1260.

TRINOMIAL, or TRINOMIAL ROOT, in mathematics, is a root conſiſting of three parts connected together by the ſigns + or −; as $x+y+z$, or $a+b-c$.

TRIO, in muſic, a part of a concert wherein three perſons ſing; or, more properly, a muſical compoſition conſiſting of three parts.

Trios are the fineſt kinds of compoſition, and theſe are what pleaſe moſt in concerts.

TRIONES, in aſtronomy, a ſort of conſtellation or aſſemblage of ſeveral ſtars in the Urſa Minor, commonly called Charles's Wain. See the article URSA.

TRIOPTERIS, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh concave petals and ten capillary filaments, topped with roundiſh erect antheræ: there is no pericarpium, but the flower is ſucceeded by three erect ſeeds, which are carinulated on their backs.

TRIOSTEUM, in botany, a genus of plants, whoſe flower is monopetalous and tubuloſe, containing five ſlender filaments the length of the corolla, and topped with oblong antheræ: the fruit is an oval berry, having three cells, each containing an obtuſe, three-cornered, oſſeous ſeed.

This genus comprehends the trioſteoſpermum of Dillenius.

TRIOURS, in law, are ſuch perſons as are choſen by the court to examine whether a challenge made to the whole panel of jurors, or any part of them, be juſt or not.

TRIPARTITE, *Tripartitus*, ſomething divided into three parts, or made by three parties, as indenture tripartite, &c.

TRIPARTITION, a diviſion by three, or the taking the third part of any number or quantity.

TRIPETALOUS FLOWERS, among botaniſts, are thoſe whoſe corolla conſiſts of three leaves, or petals.

TRIPHTHONG, in grammar, an aſſemblage or concourſe of three vowels in the ſame ſyllable, as *quæ*.

TRIPLARIS, in botany, a genus of plants, whoſe flower conſiſts of three petals, with three ſubulated filaments, terminated with ovate, linear, membranaceous antheræ: there is no pericarpium; but the ſeed, which is an ovate nut, is contained in the tube of the cup.

TRIPLE, threefold. See the articles RATIO and SUB-TRIPLE.

TRIPLE, in muſic, is one of the ſpecies of meaſure or time.

Triple-time conſiſts of many different ſpecies, whereof there are in general four, each of which has its varieties. The common name triple is taken hence, that the whole half of the bar is diviſible into three parts, and is beaten accordingly.

TRIPLICATE RATIO, the ratio which cubes bear to one another.

This ratio is to be diſtinguiſhed from triple-ratio, and may be thus conceived: in the geometrical proportions 2, 4, 8, 16, 32, as the ratio of the firſt term (2) is to the third (8) duplicate of that of the firſt to the ſecond, or of the ſecond to the third, ſo the ratio of the firſt to the fourth is ſaid to be triplicate of the ratio of the firſt to the ſecond, or of that of the ſecond to the third, or of that of the third to the fourth, as being compounded of three equal ratios.

TRIPOD, *Tripos*, in antiquity, a famed ſacred ſeat or ſtool, ſupported by three feet, whereon the prieſts and ſibyls were placed to render oracles.

TRIPOLI, in natural hiſtory, the name of an earthy ſubſtance much uſed by the lapidaries to poliſh ſtones, and by the braſiers, and other the like artiſts, to clean metalline veſſels. It is of two kinds, the yellowiſh and reddiſh-white; the yellowiſh-white kind is called by authors alana gleba, tripolis and terra tripolitana; this is the produce of Ger-

Germany Saxony, and France; there is alſo of it in the neighbourhood of Venice, but it is found in greateſt plenty in many parts of Africa. It is found a dry hard earth of a very pale yellowiſh-white, of a firm texture and moderately heavy; it is ſometimes found of itſelf, conſtituting a ſtratum; but it is more frequently met with in detached pieces among ſtrata of other matter. It is of a rough, irregular duſty ſurface; it adheres ſlightly to the tongue, is dry, hard, and harſh to the touch, is not to be broken between the fingers, and ſlightly ſtains the hands: it makes no effervescence with aqua-fortis, and makes a ſlight hiſſing noiſe on being thrown into water. The reddiſh tripoli is of our own production though not peculiar to our country; it is found in great abundance on Mendip-hills in Somerſetſhire, and not leſs plentifully in many parts of Germany, This is well known in the ſhops as a ſubſtance of great uſe in poliſhing braſs, but is not applied to any of the other uſes of the yellowiſh kind: this, like the former, is moſt frequently found in detached maſſes, and while in the earth is tolerably ſoft, and eaſily falls into flakes. When dry it becomes of a conſiderable hardneſs, and is of a fine pale reddiſh white, of a looſe open texture, compoſed of a multitude of extremely thin plates or flakes laid evenly on one ano her, and conſiderably heavy; it is of a ſmooth and ſomewhat gloſſy ſurface; it adheres very firmly to the tongue, is dry and harſh to the touch, too hard to be broken between the fingers, and does not ſtain the hands: it makes no effervescence with acids, and burns to a paler colour, with ſome additional hardneſs.

TRIPPING, in heraldry, denotes the quick motion of all ſorts of deer, and of ſome other creatures, repreſented on one foot as it were on a trot.

TRIPTOTES, *Triptota*, in grammar, defective nouns which have only three caſes; ſuch is *mele*, *tempe*, *grates*, *prece*, &c.

TRISECTION, or TRISSECTION, the dividing a thing into three. The term is chiefly uſed in geometry, for the diviſion of an angle into three equal parts. The triſection of an angle geometrically, is one of thoſe great problems whoſe ſolution has been ſo much ſought by mathematicians for theſe two thouſand years, being in this reſpect on a footing with the quadrature of a circle, and the duplicature of the cube angle.

TRISMEGISTUS, an epithet or ſurname given to one of the two Hermetes, or Mercuries, kings of Thebes in Egypt, who is ſaid to be cotemporary with Moſes.

TRISPAST, *Triſpaſton*, in mechanics, a machine with three pullies or an aſſemblage of three pullies for raiſing of great weights.

TRITICUM, wheat in botany. See the article WHEAT.

TRITON, in ichthyology, a genus of fiſh, the body of which is oblong, the roſtrum at the mouth of a ſpiral form, the tentacula fourteen in number, and twelve of them cheliferous.

TRITON, in poetry, a ſea demi-god, held by the antients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders and commands from ſea to ſea.

TRITONE, *Tritono*, in muſic, a falſe concord conſiſting of three tones, or a greater third and a greater tone.

TRITURATION, *Tritura*, in pharmacy, the act of reducing a ſolid body into a ſubtile powder; called alſo levigation and pulverization.

This is principally employed to reduce hard ſubſtances to fine powders, either by the mortar or by way of levigation on a marble: there is little difficulty in this, beſides the labour. Trituration has a great ſhare in ſome inſtances, in raiſing or depreſſing the efficacy of what comes under its management; for in grinding all thoſe bodies, whoſe efficacy conſiſts in the peculiar ſhape and points of their component parts, the more and finer they are broke, the leſs they will operate: thus may calomel be rendered much gentler, and made capable of being given in much larger quantities, only by long rubbing in a glaſs mortar; for the continual triture has the ſame effect upon it, as repeated ſublimation, which is only breaking of the ſaline ſpicula more and more, until it becomes almoſt plain mercury. But in reſinous ſubſtances, particularly thoſe which are purgative, as jalap, ſcammony, &c. the finer the powder they are reduced into, the greater their efficacy is likely to be. As the ſenſe which the ſtomach and bowels have of them is in proportion to their contacts, therefore the more the ſame quantity is divided, the farther will it diffuſe itſelf, and vellicate the fibres; that is, in other words, it will work the more.

TRITURATION is alſo uſed in medicine for the action of the ſtomach on the food, whereby it is fitted for nouriſhment.

TRIUMFETTA, in botany, a plant, which grows naturally in the Weſt-Indian iſlands, where it riſes, with an upright ſtem, to the height of ſix or ſeven feet, which becomes ligneous toward the bottom, and divides upward into four or five branches, which are furniſhed with leaves placed alternately their whole length, theſe are about two inches and a half long, and almoſt two inches broad toward the baſe, divided almoſt into three lobes toward the top, and the middle diviſion ending in an acute point; they are veined on their under ſide, are covered with a ſoft brown down, and have ſeveral veins running from the mid-rib to the ſides; their upper ſurface is of a yellowiſh green, and a little hairy, their borders are acutely but unequally ſawed, and ſtand upon footſtalks an inch long; the branches are terminated by long ſpikes of flowers, which

which come out in cluſters from the ſide of the principal footſtalk, and are of a yellow colour, each containing five linear, concave, obtuſe and erect petals, with ſixteen ſubulated ſtamina: the fruit is a globoſe capſule, every where ſurrounded with hooked prickles, and contains four cells, each incloſing a ſeed, which is convex on one ſide, and angular on the other; this plant generally flowers here in July and Auguſt, and is propagated by ſowing the ſeeds on a hot bed in the ſpring, which when come up ſhould be planted ſingly in pots, and plunged in the bark bed in the ſtove, where they muſt continually be kept.

TRIUMPH, in Roman antiquity, a public and ſolemn honour conferred by the Romans on a victorious general, by allowing him a magnificent entry into the city. The triumph was of two kinds, the leſſer, and the greater, the firſt of which is the ſame with the ovation. See OVATION.

The greater triumph, called alſo curulis, or ſimply the triumph, was decreed by the ſenate to a general, upon the conquering of a province, or gaining a ſignal victory.

The day appointed for the ceremony being arrived, ſcaffolds were erected in the forum and circus, and all the other parts of the city, where they could beſt behold the pomp: the ſenate went to meet the conqueror without the gate called capena or triumphalis, and marched back in order to the capitol; the ways being cleared by a number of officers and tipſtaffs, who drove away ſuch as thronged the paſſage, or ſtraggled up and down. The general was clad in a rich purple robe, interwoven with figures of gold, ſetting forth his great exploits; his buſkins were beſet with pearl, and he wore a crown, which at firſt was only laurel, but afterwards gold; in one hand he bore a branch of laurel, and in the other a truncheon. He was drawn in a magnificent chariot, adorned with ivory and plates of gold, drawn uſually by two white horſes; though ſometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants; that of Marc Antony, by lions; that of Heliogabalus, by tygers; that of Aurelian, by deer, &c. His children were at his feet, and ſometimes on the chariot horſes. The proceſſion was led up by the muſicians, who played triumphal pieces, in praiſe of the general: theſe were followed by young men, who led the victims to the ſacrifice, with their horns gilded, and their heads adorned with ribbands and garlands; next came the cars and waggons, loaded with all the ſpoils taken from the enemy, with their horſes, chariots, &c. theſe were followed by the kings, princes, and generals, who had been taken captives, loaden with chains: after theſe appeared the triumphal chariot, before which, as it paſſed, they all along ſtrewed flowers, and the people, with loud acclamations, called out *Io triumphe!* The chariot was followed by the ſenate, clad in white robes; and the ſenate by ſuch citizens as had been ſet at liberty or ranſomed: and the proceſſion was cloſed by the prieſts and their officers and utenſils, with a white ox led for the chief victim. In this order they proceeded through the triumphal gate, along the via-ſacra, to the capitol, where the victims were ſlain. In the mean time all the temples were open, and all the altars loaded with offerings and incenſe; games and combats were celebrated in the public places, and rejoicings appeared every where.

TRIUMVIR, one of the three perſons who govern abſolutely, and with equal authority, in a ſtate.

TRIUMVERATE, an abſolute government adminiſtred by three perſons, with equal authority.

TROCHAIC VERSE, in the latin poetry, a kind of verſe, ſo called becauſe the trochees chiefly prevail, as the iambus does in the iambic. It generally conſiſts of ſeven feet and a ſyllable; the odd feet, for the moſt part, conſiſt of trochees, though a tribrachys is ſometimes admitted, except in the ſeventh foot: theſe two feet are likewiſe uſed in the other places, as is alſo the ſpondæus, dactylus, and anapæſtus. The following is an example.

1 2 3 4 5 6 7 ½

Solus | aut rex | aut po | eta | non quot | annis | naſci | tur.

TROCHANTER, in anatomy, a name given, to two apophyſes, ſituated in the upper part of the thigh bone: they receive the tendons of moſt of the muſcles of the thigh. See the article FEMUR.

TROCHE, *Trochiſcus*, in pharmacy, a ſort of medicine made of glutinous ſubſtances, into little cakes, and afterwards exſiccated. The four following rules are to be obſerved in making of them: 1. The ingredients are to be reduced to a powder. 2. If the maſs proves ſo glutinous as to ſtick to the fingers in making up, the hands may be anointed with any convenient ſweet or aromatic oil; or elſe ſprinkled with powder of ſtarch, or with that of liquorice. 3. In order to dry thoroughly the troches, put them on an inverted ſieve, in a ſhady airy place, and frequently turn them. 4. The troches are to be kept in glaſs veſſels, or in earthen ones well glazed. There are troches of various kinds, and for various intentions, as purgative, alterative, aperitive, coroborative, &c. The chief troches now in uſe are thoſe of myrrh and liquorice, and thoſe of the teſtaceous powders for the heart-burn.

TROCHEE, *Trochæus*, in the Greek and Latin poetry, a foot conſiſting of two ſyllables, the firſt long, and the ſecond ſhort, as in the words *mūsă* and *sērvăt*.

TROCHILUS, in architecture, a name uſed by the antients for what the moderns call ſcotia.

TROCHLEA, one of the mechanical powers, uſually called a pulley. See the article PULLEY.

TROCHLEARES, in anatomy a name given to the oblique muſcles of the eye.

TROCHOID, in geometry, a curve more generally known by the name of cycloid.

TROLLIUS, in botany, a genus of plants, whoſe flower conſiſts of fourteen almoſt oval petals, whoſe points meet together, with nine linear, plane, incurved nectariums, and a great number of ſetaceous filaments topped with erect antheræ; the fruit conſiſts of a number of capſules, collected into an ovate head, each containing a ſingle ſeed.

TRONAGE, an antient cuſtomary toll, paid for weighing of wool. This word is particularly mentioned in a charter granted to the mayor and citizens of London; in which city there is an officer called tronator, whoſe buſineſs it is to weigh the wool that is brought thither.

TROOP, a ſmall body of horſe or dragoons, about fifty or ſixty, ſometimes more, ſometimes leſs; commanded by a captain. Each troop, beſides a captain, has a lieutenant, cornet, quarter-maſter, and three corporals, who are the loweſt officers of a troop.

TROPÆOLUM, Indian creſs, in botany, a genus of plants, whoſe flower conſiſts of five roundiſh petals, inſerted into the diviſions of the cup; the two upper ones ſet cloſe to the foot ſtalk; the three others have very long and barbated ungues; the ſtamina are eight ſhort ſubulated, declining, unequal filaments, topped with oblong aſſurgent, erect antheræ; the fruit conſiſts of three furrowed berries, convex on the outſide, and angulated within, each containing a ſingle ſeed, gibbous on one ſide, angular on the other and ſtriated.

The Indian creſs, is eaſily propagated by the ſeeds being ſown in the ſpring, where they are intended to perfect themſelves, the flowers are frequently eaten in ſallads, having a warm taſte like the garden creſs, and are reckoned very wholeſome; the ſeeds are often pickled, and are by many eſteemed preferable to any kind of pickle now uſed, a variety of this plant producing double flowers, is much eſteemed for its beauty, but as the plenitude of the petals deſtroys it generative functions, there is no other method of increaſing it, than by layers or cuttings, which being performed in any of the ſummer months they take root very freely, but being of a tender nature, they require a hot houſe for their preſervation in winter.

TROPE, in rhetoric, a kind of figure of ſpeech, whereby a word is removed from its firſt and natural ſignification, and applied with advantage to another thing, which it does not originally mean; but only ſtands for it, as it has a relation to, or connection with it: as in this ſentence, *God is my rock*. Here the trope lies in the word *rock*, which being firm and immoveable, excites in our minds the notion of God's unfailing power, and the ſteady ſupport which good men receive from their dependence upon him.

Tropes are uſed for the ſake of an agreeable variety; they divert the mind and revive attention, when it begins to flag and be weary. In many caſes there is an abſolute neceſſity for the writer or ſpeaker to repeat the ſame thing ſeveral times; therefore to prevent the tireſome repetition of the ſame words, he carefully diverſifies his expreſſions, and judiciouſly intermixes plain and figurative language. Tropes add a wonderful ornament and ſtrength to a diſcourſe, and often give the mind a brighter and ſtronger idea of a thing, than proper words: Thus Virgil calling the two Scipios the *thunder-bolts of war*, repreſents the rapid ſpeed and victorious progreſs of their arms more emphatically, than all the plain terms of the Roman language could have done. In order to make uſe of tropes ſeaſonably, and with advantage, the following rules ſhould be obſerved: 1. Be ſparing and cautious in the uſe of them, and omit them when they are not either as plain as proper words, or more expreſſive: tropes are the the riches of a language, and it will be an imputation upon a man to laviſh them away without diſcretion. 2. Care muſt be taken, that tropes hold a proportion to the ideas intended to be raiſed by them; there ought to be an eaſy and unforced relation betwixt the trope and the proper word it is put for, or the thing intended to be expreſſed by it: when there is not this ſuitableneſs and relation, the expreſſion at beſt will not only be harſh and unpleaſant, but often ridiculous and barbarous. In order to preſerve this relation, a trope ought not to expreſs more or leſs than the thing requires; and things capable of heightening or ornament ought not to be debaſed nor vilified by low expreſſions; nor ſmall matters over-magnified by pompous and ſwelling words. 3. A trope ought to be obvious and intelligible, and therefore muſt not be fetched from things too remote, ſo as to require much reading and learning to apprehend it.

TROPHIS, in botany, a genus, producing male and female flowers on diſtinct plants; the corolla of the male conſiſts of four obtuſe patent petals, with four capillary ſtamina the length of the petals; the female flower hath no corolla, but conſiſts of a ſmall cup compoſed of one leaf, with an ovate germen, and ſlender and bipartite piſtil; the fruit is a rough unilocular berry, ſlightly furrowed, and contains an almoſt globular ſeed.

TROPHY, *Tropæum*, among the antients, a pile or heap of arms of a vanquiſhed enemy, raiſed by the conqueror in the moſt eminent part of the field of battle.

The trophies were uſually dedicated to ſome of the gods, eſpecially Jupiter. The name of the deity to whom they were inſcribed, was generally mentioned, as was that alſo of the conqueror. The ſpoils were at firſt hung upon the trunk of a tree; but

but inſtead of trees, ſucceeding ages erected pillars of ſtone, or braſs, to continue the memory of their victories. To demoliſh a trophy was looked upon as a kind of ſacrilege, becauſe they were all conſecrated to ſome deity.

The repreſentation of a trophy is often to be met with on medals of the Roman emperors, ſtruck on occaſion of victories; wherein, beſides arms and ſpoils, are frequently ſeen one or two captives by the ſides of the trophy.

TROPHY-MONEY, denotes certain money annually raiſed in the ſeveral counties of the kingdom, towards providing harneſs, and maintaining the militia.

TROPICS, in aſtronomy and geography, are two circles ſuppoſed to be drawn on each ſide of the equinoctial, and parallel thereto. That on the North-ſide of the line is called tropic of cancer, and the Southern tropic has the name of Capricorn, as paſſing through the beginning of thoſe ſigns. They are diſtant from the equinoctial 23° 29′. Two circles drawn at the ſame diſtance from the equator on the terreſtrial globe, have the ſame names in geography, and they include that ſpace or part of the ſphere, which is called the torrid zone, becauſe the ſun is, at one time or other, perpendicular over every part of that zone, and extremely torrifies or heats it.

TROT, in the manege, one of the natural paces of a horſe performed with two legs in the air, and two on the ground at the ſame time croſswiſe, like St. Andrew's croſs, and continuing ſo alternately to raiſe the hind-leg of the one ſide, and the fore-leg of the other ſide at once, leaving the other hind and fore-leg upon the ground, till the former come down. In this motion the nearer the horſe takes his limbs from the ground, the opener, the evener and ſhorter his trot will be. If he takes up his feet ſlovenly, it is a ſign of ſtumbling and lameneſs; if he treads narrow or croſs, it betokens interfering or failing; if he treads long, it ſhews over-reaching; if he ſteps uneven, it beſpeaks toil and wearineſs.

TROVER, in law, an action which a man hath againſt one that, having found any of his goods, refuſeth to deliver them upon demand.

TROUGH *of the Sea*, is the hollow or cavity made between two waves or billows, in a rolling ſea.

TROY WEIGHT, in commerce. See the article WEIGHT.

TRUDE, in the art of war, denotes a ſuſpenſion of arms, or a ceſſation of hoſtilities between two armies, in order to ſettle articles of peace, bury the dead, or the like.

TRUCHMAN, DRAGOMAN, or DROGMAN, in the countries of the Levant, ſignifies an interpreter. See DRAGOMAN.

TRUCKS, among gunners, round pieces of wood, fixed on the axle-trees of carriages; to move the ordnance at ſea, and ſometimes alſo at land.

TRUE, ſomething agreeable to the reality of things, or to truth.

TRUE *Place of a Planet* or *Star*, in aſtronomy, is a point of the heavens, ſhewn or pointed out by a right line, drawn from the center of the earth, through the center of the planet or ſtar. See PLANET, &c.

TRUFFLES, *Tubera terræ*, in natural hiſtory, a kind of ſubterraneous vegetable production, not unlike muſhrooms, being a genus of fungi, which grows under the ſurface of the earth. See FUNGUS.

The truffle is only a fleſhy tubercle, covered with a hard ſort of cruſt, rough, and ſomewhat regularly furrowed on the ſurface, almoſt like the cypruſs-nut. It does not riſe above the ſurface of the earth, but lies concealed about half a foot below it. Great numbers of them are found in the ſame place, of different ſizes: ſome of them are now and then found of a pound weight, or even a pound and a quarter; theſe laſt are but rare, and Pliny only mentions their being of a pound weight.

They grow at the feet and under the ſhades of trees, ſometimes about the roots of ſtones, and ſometimes in clear earth. Their favourite trees are either the white or green oak, as the elm is that of the morellæ. They begin to be found when warm weather firſt ſucceeds the cold, ſooner or later, as the ſeaſon is more or leſs mild; for they have ſometimes been very rare after hard winters. At firſt they appear only like little round peas, red without, and white within. Theſe peas grow larger by degrees; from that time they take out of the ground what they commonly call white truffles; theſe are of themſelves inſipid, and people dry them as an ingredient for ragouts, becauſe they keep better when dried, than marbled ones do. It is a common opinion that truffles which have been once removed from their places, are never after capable of being nouriſhed, even when put in ſome earth from which they were originally taken: but if one leave them there for a certain ſeaſon, without diſturbing them, they grow inſenſibly larger; their bark becomes black, rough, and unequal, though they always retain their whiteneſs within. Hitherto they have very little ſmell or taſte, and can only be uſed in ragouts: theſe are always called the firſt white truffles, and are not to be made a different ſpecies from the marbled or black ones gathered in the end of autumn, and even in the winter after the froſts are begun.

When the truffles are at maturity, they have a very good ſmell and taſte; and are fit to be dug from the month of October to the end of December; and ſometimes to the end of February and March,

March, when they are even at that time marbled; whereas thoſe gathered from the month of April till July and Auguſt, are only white.

If people neglect to gather the truffles when arrived at a due degree of maturity, they rot; and then we may obſerve the reproduction of the truffle; becauſe, after ſome time, we ſee ſeveral bunches of other young truffles filling up the places of the rotten ones. Theſe young truffles are nouriſhed till the firſt colds come on; and if the froſts are not intenſe, they get over the winter, and furniſh us betimes with the freſh green truffles.

As to the virtues of truffles, the common opinion is, that they are hot; Galen, however, according to Matthiolus, looks upon them as indifferent, and the baſis of all other ſeaſoning; and, indeed, it is to this purpoſe that they are uſed in all ragouts. Avicenna ſpeaks of them in a manner quite different, and ſays, they engender thick humours more than any other food; that they are hard of digeſtion, heavy on the ſtomach, and, when much uſed, have a tendency to bring on an apoplexy and palſy. Theſe two authors may be reconciled, if we conſider two qualities in the truffle, which are capable of producing two different effects: firſt, they may prove hot of themſelves, by emitting their volatile ſalts into the ſtomach; or, by being mixed with ſalt, pepper, and other ſpices, which they drink up like a ſponge: in the ſecond place, they may prove of hard digeſtion, when eaten immoderately by a perſon of a weak ſtomach; in which caſe, they produce bad effects, ſtagnate, and form themſelves into a glareous ſubſtance, which diſorders the ſtomach, and which may be occaſioned by the cold quality aſcribed to them by Galen. As a proof that the truffle is of hard digeſtion, it has this in common with other fruits, that it grows hard in ſpirit of wine, and is with difficulty diſſolved in water.

TRUMPET, a muſical inſtrument, the moſt noble of all portable ones of the wind kind, uſed chiefly in war, among the cavalry, to direct them in the ſervice.

Marine-TRUMPET, is a muſical inſtrument conſiſting of three tables, which form its triangular body.

It has a very long neck, with one ſingle ſtring, very thick, mounted on a bridge, which is firm on one ſide, but tremulous on the other. It is ſtruck by a bow with one hand, and with the other the ſtring is preſſed, or ſtopped, on the neck by the thumb.

It is the trembling of the bridge, when ſtruck, that makes it imitate the ſound of a trumpet, which it does to that perfection, that it is ſcarce poſſible to diſtinguiſh the one from the other; and this is what has given it the denomination of marine-trumpet; though, in propriety, it is a kind of monochord.

Harmonical-TRUMPET, an inſtrument that imitates the ſound of a trumpet; which it reſembles in every thing, excepting that it is longer, and conſiſts of more branches; it is generally called ſackbut.

Speaking-TRUMPET, is a tube from ſix to fifteen feet long, made of tin, perfectly ſtraight, and with a very large aperture; the mouth-piece being big enough, to receive both lips.

TRUMPET-FLOWER, *Bignonia*, in botany. See BIGNONIA.

TRUMPET-SHELL, the Engliſh name of the buccinum of authors. See BUCCINUM.

TRUNCATED, in general, is an appellation given to ſuch things as have, or ſeem to have, their points cut off: thus we ſay, a truncated cone, pyramid, leaf, &c.

TRUNDLE, a ſort of carriage with low wheels, whereon heavy and cumberſome burdens are drawn.

TRUNK, *Truncus*, among botaniſts, denotes the ſtem, or body of a tree; or that part between the ground and the place where it divides into branches.

In anatomy, trunk is uſed for the buſto of a human body, excluſive of the head and limbs, comprehending the abdomen and thorax. See the articles ABDOMEN and THORAX.

TRUNNIONS, or TRUNIONS *of a Piece of Ordnance*, are thoſe knobs or bunches of the gun's metal, which bear her up on the cheeks of the carriage: and hence the trunnion-ring is the ring about a cannon, next before the trunnions.

TRUSS, *Truſſa*, a bundle, or certain quantity of hay, ſtraw, &c.

A truſs of hay is to contain fifty-ſix pounds, or half a hundred weight; thirty-ſix truſſes make a load. In June and Auguſt the truſs is to weigh ſixty pounds, on forfeiture of eighteen ſhillings per truſs.

TRUSS, is alſo uſed for a ſort of bandage or ligature, made of ſteel, or the like matter, wherewith to keep up the parts, in thoſe who have hernias or ruptures. See HERNIA.

TRUSS *of Flowers*, is uſed, by floriſts, to ſignify many flowers growing together on the head of a ſtalk, as in the cowſlip, auricula, &c.

TRUSS *of Forage*, is as much as a trooper can carry on his horſe's crupper.

TRUSSES, in a ſhip, are ropes made faſt to the parrels of a yard, either to bind the yard to the maſt when the ſhip rolls, or to hale down the yards in a ſtorm, &c.

TRUSSING, in falconry, is a hawk's raiſing any fowl or prey aloft; firſt ſoaring up, and then deſcending with it to the ground.

TRUST, in law, ſignifies, in general, that confidence which one perſon repoſes in another; and in caſe of non-performance, or breach of this truſt, the remedy is by bill in equity, as the common law uſually takes no notice of truſts.

TRUSTEE, one who has an eſtate, or money, put

put or truſted in his hands, for the uſe of another. Where two or more perſons are appointed truſtees, if one of them only receives all, or the greateſt part, of the profits of the lands, &c. and is in arrear, and unable to ſatisfy the perſon to whom he is ſeiſed in truſt, the other, in that caſe, ſhall not be anſwerable for more than comes to his hands.

TRUTH, *Veritas*, a term uſed in oppoſition to falſhood, and applied to propoſitions which anſwer or accord, to the nature and reality of the thing whereof ſomething is affirmed or denied.

Truth, according to Mr. Locke, conſiſts in the joining or ſeparating of ſigns, as the things ſignified by them do agree or diſagree one with another. Now the joining or ſeparating of ſigns is what we call making of propoſitions. Truth then, properly, relates only to propoſitions, whereof there are two ſorts, mental and verbal; as there are two ſorts of ſigns commonly made uſe of, viz. ideas and words. See IDEA and WORD.

Mental propoſitions are thoſe wherein the ideas in our underſtanding are put together, or ſeparated, by the mind perceiving or judging of their agreement or diſagreement.

Verbal propoſitions are words put together, or ſeparated, in affirmative or negative ſentences: ſo that a propoſition conſiſts in joining or ſeparating of ſigns; and truth conſiſts in putting together, or ſeparating thoſe ſigns, according as the things they ſtand for agree or diſagree.

Moral TRUTH, conſiſts in ſpeaking things according to the perſuaſion of our minds, and is called alſo veracity.

Metaphyſical, or *Tranſcendental* TRUTH, is nothing but the real exiſtance of things conformable to the ideas which we have annexed to their names

TRY, in the ſea-language. A ſhip is ſaid to try, or lie a-try, when no ſails are abroad but the main-ſail or mizzen-ſail.

TUB, in commerce, denotes an indeterminate quantity or meaſure: thus, a tub of tea contains about ſixty pounds; and a tub of camphor from fifty-ſix to eighty pounds.

TUBE, *Tubus*, in general, a pipe, conduit, or canal; a cylinder hollow withinſide, either of lead, iron, wood, glaſs, or other matter, for the air, or ſome other fluid, to have a free paſſage, or conveyance, through. See the article PIPE.

Small ſilver or leaden tubes are frequently uſed, by ſurgeons, to draw off blood, matter, or water, from the different parts of the body.

The Conſtruction of a draw TUBE, *for a Teleſcope.* The chief points to be regarded here are, that the tube be not troubleſome by its weight, nor liable to warp and diſturb the poſition of the glaſſes; ſo that every kind of tube will not ſerve in every caſe. See the article TELESCOPE.

1. If the tube be ſmall, it is beſt made of thin braſs plates covered with tin, and formed into pipes or draws, to ſlide one within another.

2. For long tubes, iron would be too heavy, for which reaſon ſome chuſe to make them of paper, thus: a wooden cylinder is turned, of the length of the paper to be uſed, and of a diameter equal to that of the ſmalleſt draw: about this cylinder is rolled paper till it be a ſufficient thickneſs; when one pipe is dry, provide others after the ſame manner, ſtill making the laſt ſerve for a mould to the next, till you have enough for the length of the tube deſired. Laſtly, to the extremes of the draws are to be glewed wooden ferrils, that they may be drawn forth the better.

3. Since paper draws are apt to ſwell with moiſt weather, ſo as to ſpoil their ſliding; and in dry weather to ſhrink, which renders them looſe and tottering; in both which caſes the ſituation of the lens is eaſily diſturbed; the beſt method of making of tubes is as follows: Glue parchment round a wooden cylinder, and let the parchment be coloured black, to prevent the reflecting rays making any confuſion: provide very thin ſlits of beech, and bending them into a cylinder, glue them carefully to the parchment; cover this wooden caſe with white parchment, and, about its outer extreme, make a little ring or ferril: after the ſame manner, make another draw over the former, and then another, till you have enough for the length of the tube.

To the inner extremes of each draw fit a wooden ferril, that the ſpurious rays, ſtriking againſt the ſides, may be intercepted and loſt. In theſe places where the lenſes are to be put, it will be proper to furniſh the ferrils with female ſcrews. Provide a wooden cover to defend the object-glaſs from the duſt; and, putting the eye-glaſs in its wooden ferril, faſten it by the ſcrew to the tube. Laſtly, provide a little wooden tube of a length equal to the diſtance the eye-glaſs is to be from the eye, and fit it to the other extreme of the tube.

TUBER, or TUBERCLE, in botany, a kind of round turgid root, in form of a knob or turnip.

The plants which produce ſuch roots are hence denominated tuberoſe, or tuberous, plants.

TUBER, or TUBEROSITY, in medicine, is uſed for a knob, or tumour, growing naturally in any part; in oppoſition to tumours, which ariſe accidentally, or from diſeaſe.

TUBERCLES, among phyſicians, denote little tumours which ſuppurate and diſcharge pus, and are often found in the lungs, eſpecially of conſumptive perſons. See the articles CONSUMPTION and PHTHISIS.

TUBEROSE, polianthos, in botany, a bulbous rooted plant, much admired for the fragrancy of its bloſſoms, which are produced in ſpikes on the upper part of a ſtem which riſes four or five feet high; each

each flower conſiſts of a monopetalous funnel-ſhaped corolla, the tube of which is incurved, oblong, and divided into ſix ovate patent ſegments; the ſtamina are ſix thick obtuſe filaments, topped with linear antheræ: the fruit is an obtuſe, three cornered, roundiſh capſule, having three valves and three cells, which contain a number of plane ſemi-orbiculated ſeeds.

The tuberoſe root ſhould be planted in pots in March, and plunged in a moderate hot-bed, and as they advance in growth ſhould have a good ſhare of air and neceſſary watering until they have arrived to their perfection, which will be in July and Auguſt, when they may be planted where moſt agreeable for their fine perfume, which is ſuſceptible at a conſiderable diſtance in a confined place.

TUBEROSE ROOTS, among botaniſts, are thoſe which are compoſed of many fleſhy tubercles, and either ſit cloſe to the ſtalk, as thoſe of the garden ranunculus, or are ſuſpended by fibres or threads, ſuch are thoſe of the potatoe, Jeruſalem artichoke, peony, &c.

TUBIPORA, or TUBULARIA, a genus of ſubmarine plants, belonging to the cryptogamia claſs, of the hardneſs of coral, and conſiſting of cylindric tubes riſing from a thin cruſt of the ſame ſort of matter with themſelves.

TUBULARIA FOSSILIS, in natural hiſtory, the name of a ſpecies of coral found very often foſſil in Germany and Italy, and compoſed of a great number of tubes, or longitudinal pipes, often reſembling ſo many worms ranged perpendicularly in the maſs.

TUBULI FOSSILIS, in natural hiſtory, the tubules, or caſes of ſea-worms, found buried in the earth.

TUBULI LACTIFERI, in anatomy, the ſmall tubes, or veſſels, through which the milk flows to the nipples of womens breaſts. See the article MILK.

TUCK *of a Ship*, the truſſing or gathering up the quarter under water; which if ſhe lie deep, makes her have a broad, or, as they call it, fat quarter, and hinders her ſteering, by keeping the water from paſſing ſwiftly to her rudder; and if this truſſing lie too high above the water, ſhe will want bearing for her works behind; unleſs her quarter be very well laid out.

TULIP, *Tulipa*, in botany, a genus of plants, whoſe flower is bell-ſhaped, and compoſed of ſix ovato-oblong, concave, erect petals; the ſtamina are ſix ſubulated filaments, topped with oblong erect quadrangular antheræ: the germen is oblong, taper, and three-cornered: it hath no ſtyle, but is crowned with a triangular, three-lobed, perſiſtent ſtigma: the fruit is a triquetrous and trilocular capſule, containing a great many flat ſeeds, ranged over each other in a double order.

The tulip-root is bulbous, from which ariſes the ſtem, from a foot to two feet high, adorned at the baſe with a few pointed leaves, of a pale green colour; on the extremity of the ſtalk the flower is produced, which is much admired for the beauty of its fine ſtripes and rich colours.

This flower is probably a native of Turkey, of which the name is a proof, being derived from the Turkiſh word *tulpent*, which ſignifies a cap or turban; but though it be originally from that country, Holland is the great magazine of the fineſt and moſt curious tulips, which are raiſed there by the diligence of the floriſts of the low countries.

In Holland they reckon four principal ſorts; 1. the early or ſpring-tulips; 2. the double-flowered tulips; 3. the late expectant tulips; 4. the late ſtriped tulips, with a yellow or white bottom.

The ſpring-tulips were formerly held in ſo great reputation in Holland, that the floriſts placed their higheſt ambition in the poſſeſſion of them. This paſſion roſe to that extravagance, from the year 1634 to 1637, that ſingle roots were ſold from 2000 to 5500 guilders; this madneſs was at laſt checked by the interpoſition of the ſtates of Holland and Weſt Frieſland, April 27, 1637; ſince that time the late-blowers have gained the preference, and the ſpring tulips are no longer in ſuch high eſtimation: however, they are not to be caſt away, as ſome of them blow, in mild ſeaſons, ſo early as February, and are very pretty, particularly a ſort called the Duke Van-Tol; their principal beauty conſiſts in their cupping well, their bright and gay colours, and being well broke. There are ſome that have their leaves prettily and lightly variegated with yellow and green, for which they are the more valuable.

When the ſpring flowers are gone off, the double tulips ſucceed; theſe are large flowers, well filled with petals, and ſtanding a foot and a half or two feet high, of a very agreeable white, variegated with a bright lively red, making a delightful ſhew at a diſtance, and the variety of their forms and colours ſtrikes the eye very agreeably.

The late expectant tulips, as the Dutch call them, from the expectation they have of raiſing fine new flowers from them; they alſo call them tulips of one colour, or whole blowers: we, in England, call them breeding tulips, becauſe from them the moſt admired new flowers are produced; in Germany they have the name of mother tulips, becauſe we have nothing fine in the tulip kind but what owes its birth to them. They are not very beautiful in themſelves, but are very valuable for the reaſons above-mentioned, and a good floriſt ſhould never be without a conſiderable number of them in his garden, from which he may breed very fine tulips, a thing he muſt never hope to accompliſh but by their means, for theſe anſwer the ſame purpoſe in raiſing curious new tulips, as the ſeed does in hyacinths.

Many ſtrange whims have been practiſed in order to

to produce the variety of colours in the breeding tulips; ſome have been led by their capricious folly to cut two roots through the heart, and to imagine that they ſhould accompliſh their deſire by joining the parts of the different roots together, not conſidering that the dividing a root in that manner was robbing it of life; but we ſhall paſs over theſe uſeleſs chimeras, and ſhew two very eaſy and ſimple methods of producing this marvelous alteration: The firſt is to ſet the bulbs of the breeders in a very poor ſoil; and this practice is built on a well-grounded hypotheſis, which has ever prevailed, and is ſtill maintained, that the breaking of flowers is occaſioned by the weakening of their natural ſtrength, and no cauſe is better adapted to produce this effect than the defect of nutriment. The ſecond method is to make as great a change as poſſible in the ſoil the bulbs are to be ſet in, either by taking them out of one garden and planting them in another, or by mixing different kinds of earth, or by procuring new ſorts every year from Holland; as we have often experienced ſo great a change of air and ſoil cauſes a great variety of colours: but we do not poſitively aſſert that theſe methods will always ſucceed, becauſe nature will not at all times ſecond our endeavours; it is, however, moſt certain, that there are no better methods known than thoſe abovementioned.

The variegated late blowers are the laſt ſort of tulips that deſerve notice; theſe are, beyond diſpute, the moſt diverſified, beautiful, and perfect of all: there is an almoſt infinite number of varieties, all ariſing originally from one diſtinct ſpecies, which are reduced by floriſts into five claſſes: 1. tulips with a white bottom, ſtriped with brown, called baguette primo; 2. ſuch as have a white bottom, ſtriped with brown, called baguette rigaut; 3. thoſe with a white bottom, ſtriped with violet and blackiſh brown, called bibloemen; 4. thoſe with a white bottom, ſtriped with roſe colour, vermilion, and ruby; 5. ſuch as have a yellow bottom, ſtriped with different colours, called bizarres.

The properties required in a fine tulip, are, 1. that it ſhould have a tall ſtem, riſing to the height of three or four feet, becauſe this is agreeable to the nature of the tulip; all floriſts, indeed, do not concur in this opinion, for in ſome places the height of the tulip is not regarded, whereas in England, Holland, and Flanders, a tulip with a ſhort ſtem is but little eſteemed.

2. That the corolla be large, well proportioned, and compoſed of ſix petals, three within and three without; theſe ſhould not be too long nor pointed, becauſe that would ſpoil their ſymmetry, which frequently occurs in old tulips, and ſometimes in modern ones; theſe petals when opened ſhould neither turn inward nor bend outward, for if they turn in, much of their beauty is diminiſhed, yet there are many fine tulips which labour under this defect; the petals ought alſo to be round at their extremities, broad, and thick, for when they are thin they crumple, and the colours are apt to be blended.

3. The colours ought to be lively and bright; thoſe that are moſt valued and held in greateſt eſteem, are, the black, golden-yellow, purple-violet, roſe, and vermilion colours. Tulips whoſe flowers are finely ſtriped, and variegated with three colours, diſtinct and unmixed, with very ſtrong and regular ſtreaks, without any tinge of the colour of the breeder, are the fineſt bizarres, and may be called perfect tulips.

It would alſo be a perfection in tulips if the colours always came out the ſame, but this is not the caſe, it happening ſometimes that a flower of very great price, degenerates and becomes of no value, and there is no known method to prevent this metamorphoſis, for which nature alone is anſwerable. All tulips are not equally liable to this alteration of colour, ſome being leſs ſuſceptible of it than others, as the baguette primo and the baguette rigaut, which are the leaſt ſubject to it of any: thoſe that have a white bottom with a very fine ſhade, as alſo the bizarres, whoſe fine diverſified colours form a kind of beard at the extremities of the petals, are not very changeable; but the true bizarres, that are painted with a mixture of ſeveral colours, and tinged with that of the breeder, have their beauty ſoon obliterated by a ſudden change.

Tulips are increaſed either from off-ſets or ſeeds; the ſeaſon for planting the off-ſets and blowing-roots is in October or November; they may alſo be planted in January or February, where the ſoil is very moiſt.

The moſt curious in flowers ſet them in beds at ſix, ſeven, or eight inches aſunder, according to the ſorts, and at the depth of ſix or ſeven inches: when they begin to appear above ground, in the ſpring, bad weather and froſts may much injure the tender leaves, and thereby do great damage to the flowers; therefore, at thoſe times, they ſhould be carefully ſheltered with mats, &c. for if this be neglected, the ſtems and leaves will ſuffer by it; nor will the miſchief end there, but will be extended both to the flowers, which will be leſs beautiful, and alſo to the roots, which will be weakened and very much affected by the loſs of the leaves.

When the ſtems grow up and the flowers begin to colour, they ought to be ſupported, otherwiſe the wind would break them down; for this purpoſe, ſticks ſhould be prepared of a proportional length and thickneſs, to which the ſtems ſhould be faſtened.

The tulips, when in bloom, ſhould be ſhaded from the violence of the meridian ſun, otherwiſe they will be but of ſhort duration.

The time for taking up the roots is uſually in June, when the leaves are withered; they ſhould then be laid in an airy place, but not expoſed to the

the ſun; and three or four weeks afterward, when they are well dried, they ſhould be freed from their outward ſkins, and then laid in the ſame place, where they may remain until the time of planting.

There are few but the Hollanders who have the patience to raiſe tulips from ſeeds, as we muſt wait eight or ten years before we can ſee a tulip in flower, that has been produced from ſeed, and after all it is but a whole-blower. Such, however, as like to ſow, may chuſe ſuch ſorts of tulips as pleaſe them beſt; the moſt curious, indeed, are for the breeders, but we leave every one to his own choice.

When the floriſt has fixed upon the flowers he would ſave ſeed from, he muſt let them have the benefit of the ſun and air, otherwiſe the ſeeds will not come to perfection; they muſt be ſuffered to ſtand in the ground till the ſeed-veſſels begin to open and ſhew the ſeeds of a brown colour; they muſt then be cut and laid in a dry place, letting the ſeeds remain in their capſules till the month of September: the ſeeds are then to be ſown at the depth of an inch, in pots filled with well prepared earth, which muſt be placed in the ſhade till November, when they may be expoſed to the ſun. In the ſpring they are to be ſet again in the ſhade, and afterwards watered while the leaves are green; but when the leaves are withered, the roots are to be taken out of theſe pots and put into others, which are to be expoſed to the ſun in the ſame manner as the former year: after two years, the bulbs are to be taken out of theſe ſecond pots and treated like other tulips.

TULIP-TREE, *Liriodendrum*, in botany, a plant which grows naturally in many parts of North America, where it arrives to a tree of the firſt magnitude; the young branches are covered with a ſmooth purpliſh bark, and furniſhed with large leaves, whoſe footſtalks are four inches long and ranged alternately; the leaves are of a ſingular form, being divided into three lobes, the middle one is blunt and hollowed, appearing as if a piece was cut out; the two ſide lobes are rounded, and end in blunt points; the upper ſurface of the leaves is ſmooth and of a lucid green, and the under is of a pale green; the flowers are produced at the extremities of the branches, they are each compoſed of ſix petals, three without and three within, forming a ſort of bell-ſhaped flower, much reſembling the tulip (whence the name) theſe petals are marked with green, yellow, and red ſpots, making a fine appearance when the tree is full of flowers; the ſtamina conſiſts of many filaments, with linear antheræ faſtened to their ſides; the germina are numerous, and when the petals drop, they ſwell and form a kind of cone, conſiſting of many imbricated compreſſed ſeeds: the flowers come out in July.

This tree is propagated from ſeeds ſown in the ſpring on a hot bed, and afterwards hardened by degrees to the ſun and air.

Chequered TULIP, *Fritillaria*, in botany, a genus of plants, whoſe flower is hexapetalous and campanulated, with a nectarium placed in the baſe of each petal; the ſtamina are ſix ſubulated filaments, terminated with oblong, erect, quadrangular antheræ; the fruit is an oblong, obtuſe, trilobular capſule, with three cells containing many flat ſeeds ranged in a double order.

To this genus Linnæus has added the corona imperialis of Tournefort.

TUMEFACTION, the act of ſwelling or riſing into a tumour. See the next article.

TUMOUR, or TUMOR, in medicine and ſurgery, a preternatural riſing or eminence on any part of the body. Tumour is alſo defined, by phyſicians, a ſolution of continuity ariſing from ſome humour collected in a certain part of the body, which disjoins the continuous parts, inſinuates itſelf between them, and deſtroys their proper form.

Whether there be any ſuch preternatural riſing or enlargement on any part of the body, may be diſcovered from inſpection, but more particularly by feeling. And, notwithſtanding, it is a general cuſtom to refer excreſcences, as warts, corns, and ſuch as grow in the noſe and pudenda, to the claſs of tumours; yet, becauſe they grow not from beneath, but out of, or upon, the ſkin itſelf, it is thought proper not to comprehend them in the general diviſion of tumours.

There are tumours of various kinds, diſtinguiſhed by particular names, according to the different cauſes from whence they proceed, and the particular parts wherein they are ſeated; ſome are called hot, others cold and watry; ſome are termed windy, others ſchirrhous; and ſome are named benign, others malignant: but Heiſter finds fault with theſe diſtinctions. There are ſome tumours which being contained in a proper membrane, are therefore called cyſtic; and if this ſhould be in an artery, it is uſually termed aneuriſm; but when in a vein, a varix. When in the veins of the anus, or rectum, the diſorder is termed hæmorrhoids; but if the tumour be in the ſcrotum, unguen, or at the umbilicus, it is called a hernia: if any pus, or matter, is contained in the tumour, it is called an abſceſs; and if the tumour is ſeated in the bone, it is termed exoſtoſis.

The forementioned claſs of tumours are all of them ſubdivided into ſeveral other kinds: thus the hot and burning tumours, which are the ſame with inflammations, are generally termed phlegmons when violent and ſeated in the common integuments; but when ſlighter, they are commonly called feruncles. The inflammation which is not fixed deep, but ſpreads only ſuperficially upon the ſkin, is termed an eryſipelas: the inflammatory tumour that ariſes at the finger-ends is termed paronychia: that which fixes in the groin or armpits is called a bubo; and that under the ears a parotis. When an inflamma-

tion

tion ſeizes the hands and feet from extreme cold, chilblains ariſe; which tumour is called pernio.

Encyſted TUMOURS, tumours ariſing in different parts of the body, but contained in certain membranous coats: theſe are ſometimes harder, ſometimes ſofter, of a paliſh colour, and uſually attended with little pain. Theſe tumours ariſe from obſtructions either in the glands, or in the adipoſe membrane, more eſpecially about the face and neck, where they occaſion great deformity. The membranous coat with which theſe tumours are inveſted, is often of a conſiderable thickneſs, and is uſually the coat of the diſordered gland, or ſome of the adipoſe cells. At their beginning they are uſually very ſmall and moveable; but encreaſing by ſlow degrees, they grow ſometimes to an enormous bulk.

The conſiſtence of ſome of theſe tumours is ſoft and fluctuating, and of others more hard and firm. They are of all ſhapes and ſizes, and ſome of them become hard as a callus, and unmoveable, while others are, for the generality, ſoft and moveable.

They are diſtinguiſhed according to the conſiſtence of their contents; ſome are called atheromata, from their contents reſembling paſte; others, which have them of the conſiſtence of honey, are called meliceres; but if they are of a fatty ſubſtance, like ſuet or lard, they are called ſteotomata. If they happen in a gland which becomes indurated, they are called ſchirrous: and laſtly, when they are of a fleſhy conſiſtence, they are called ſarcomata. Some of theſe tumours have been found alſo full of hair.

They are diſtinguiſhed by others according to the places where they are ſituated. Thoſe ſeated under the ſcalp are called talpa, teſtudo, or lupia. Thoſe in the neck, ſtrumæ or ſcrophulæ; and thoſe in the hands and feet, eſpecially if among the tendons, are called ganglions.

There is no general method for the cure of them; but the ſurgeon, according to their different circumſtances, attempts this by diſcuſſion, ſuppuration, or extirpation.

But if the tumour can neither be diſperſed nor ſuppurated, but continues to enlarge itſelf, it is adviſeable to extirpate it, in order to prevent its turning into a cancerous nature. There are ſeveral methods in practice for extirpating theſe tumours according to their nature and ſize: thoſe which are ſmall and hard, or hung by a root as by a ſtalk, are generally beſt removed by ligature, in the manner of warts; by which means they wither and fall off of themſelves in a few days. But the moſt ready and expeditious method is to cut them off with a ſcalpel, and then heal up the wound: but if in removing them this way you divide a conſiderable artery, you may ſtop it by ſome potential, or even the actual cautery; or elſe, by taking it up with a needle and thread. Laſtly, theſe tumours may be often removed by the application of cauſtic or corroding medicines, retained about the root by means of plaſters, compreſſes, and a bandage; and when you find the root of the tumour almoſt corroded through, the reſt may be divided by the ſcalpel. See the article CAUSTIC.

If the root of the encyſted tumour appears too large for it to be conveniently taken off by ligature, you muſt then remove it either by the knife or by the cauſtics, though the latter is generally preferred. In order to extirpate it by the knife, you muſt firſt make a longitudinal inciſion upon the tumour; and if that does not appear ſufficient, make another inciſion acroſs the former, till you think the wound large enough for taking out the tumour; in order to which you next dilate the integuments, and ſeparate them from the cyſt of the tumour, which you are to take out whole, if poſſible, either by means of the ſcalpel, a hook, or by paſſing a crooked needle, with a ſtrong thread, croſswiſe under the tumour; but great caution is neceſſary in this operation, leſt any important part that is contiguous to the tumour be injured.

The tumour being thus carefully extracted, if the wound and hæmorrhage be ſmall, you may preſs the lips together; and by covering the ſame with lint and compreſſes, retained with a proper bandage, the patient is cured in a few days time; but in caſe of a profuſe hæmorrhage, the blood is to be ſtopped either by ligature, aſtringents, or the actual or potential cautery.

TUN, or TON, originally ſignifies a large veſſel or caſk of an oblong form, biggeſt in the middle, and diminiſhing towards its two ends, girt about with hoops, and uſed for ſtowing ſeveral kinds of merchandize, for convenience of carriage; as brandy, oil, ſugar, ſkins, hats, &c.

This word is alſo uſed for certain veſſels of extraordinary bigneſs, ſerving to keep wine in for ſeveral years.

TUN is alſo a certain meaſure for liquids; as wine, oil, &c. See MEASURE.

TUN is alſo a certain weight whereby the burden of ſhips, &c. are eſtimated. See WEIGHT.

TUNA, in botany, the ſame with the cactus. See the article CACTUS.

TUNE, or TONE, in muſic, that property of ſounds whereby they come under the relation of acute and grave to one another.

Though gravity and acuteneſs are mere terms of relation, the tune of the ſound is ſomething abſolute, every ſound having its own proper tone, which muſt be under ſome determinate meaſure in the nature of the thing.

The only difference then, between one tune and another is in the degrees.

If two or more ſounds be compared together in this relation, they are either equal or unequal in the degree of tune.

Such as are equal are called uniſons.

The unequal conſtitute what we call an interval, which is the difference of time between two ſounds.

Sonorous bodies we find differ in tune: 1. According to the different kinds of matter; thus a wedge of ſilver ſounds much more acute than a wedge of gold of the ſame ſhape and dimenſions; in which caſe the tones are proportional to the ſpecific gravity. 2. According to the different quantities of the ſame matter in bodies of the ſame figure, a ſolid ſphere of braſs, one foot diameter, ſounds acuter than one of two feet diameter; in which caſe the tunes are proportional to the quantity of matter. Here then are different tunes connected with different ſpecific gravities and quantities of matter, as their immediate cauſe. In effect, the meaſures of tune are only ſought in the relations of the motions that are the cauſe of ſound, which are no way ſo diſcernable as in vibrations of chords.

In the general we find that, in two chords, all things being equal, except tenſion, or thickneſs, or length, the tunes are different; there muſt, therefore, be a difference in the vibrations owing to theſe different tenſions, &c. which difference can only be in the velocity of the courſes and recourſes of the chords, through the ſpaces wherein they move to and again. Now, upon examining the proportion of the velocity and the things juſt mentioned, wherein it depends, it is found, to a demonſtration, that all the vibrations of the ſame chord are performed in equal times. Hence, as the tone of a ſound depends on the nature of thoſe vibrations, whoſe difference we can conceive no otherwiſe than as having different velocities; and as the ſmall vibrations of the ſame chord are performed in equal times, and it is found true, in fact, that the ſound of any body, ariſing from any individual ſtroke, though it grows gradually weaker, yet continues the ſame tone from firſt to laſt; it follows, that the tone is neceſſarily connected with a certain quantity of time, in making every ſingle vibration; or, that a certain number of vibrations, accompliſhed in a given time, conſtitutes a certain determinate tune; for the more frequent thoſe vibrations are, the more acute the tone; and, the ſlower and fewer they are, the more grave the ſound, though performed in the ſame ſpace of time; ſo that any given note of a tune is made by one certain meaſure of velocity of vibrations, i. e. ſuch certain courſes and recourſes of a chord or ſtring, in ſuch a certain ſpace of time, conſtitute a determinate tune.

This theory is ſtrongly ſupported by our beſt and lateſt writers on muſic, Dr. Holder, Mr. Malcolm, &c. both from reaſon and experience. Dr. Wallis, who holds it very reaſonable, adds that it is evident the degrees of acuteneſs are reciprocally as the lengths of the chords, though, he ſays, he will not poſitively affirm that the degrees of acuteneſs anſwer the number of vibrations as their true cauſe: but this difference ariſes hence, that he doubts whether the thing has been ſufficiently proved by experiment. Indeed, whether the different number of vibrations, in a given time, is the true cauſe on the part of the object of our perceiving a difference of tune, is a thing which, we conceive, does not come within the reach of experiment. It is enough that the hypotheſis is reaſonable.

TUNICA, *Tunic*, in anatomy, is applied to the membranes which inveſt the veſſels, and divers others of the leſs ſolid parts of the body; thus the inteſtines are formed of five tunics, or coats.

There are alſo five tunics, or coats, of the eye, for which ſee the article EYE.

TUNNAGE is uſed for a cuſtom or impoſt, payable to the crown, for goods and merchandize imported or exported, and is to be paid after a certain rate for every tun thereof. This duty, as well as that of poundage, was firſt granted for life to king Charles II. and has been continued in the ſame manner to his royal ſucceſſors, down to his preſent majeſty George III.

TUNNEL-NET, a net for taking partridges, which ſhould not exceed fifteen feet in length, nor be leſs than eighteen inches in breadth, or opening for the entrance.

TUNNING *of Ale or Beer*, a part of the proceſs of brewing, or rather an operation which is the ſequel thereof. When the beer has worked or fermented in an open vat, as long as is proper, tun it up into ſeaſoned veſſels, that is, ſuch as have had ale or beer in them before; for if it be put into new caſks, it muſt be made ſtronger than ordinary, elſe it will not keep ſo long, becauſe the caſk will imbibe the ſpirits, and the reſt will ſoon become flat and vapid. It is beſt to tun beer juſt when it comes to a due fermentation, and gets a good head; for then it has the moſt ſtrength to clear itſelf in the caſk, and what works over may be put into the ſmall beer, and muſt be ſupplied with freſh beer of the ſame brewing. When the beer is tunned, carry it while it works in the caſk, into a good cellar, or proper place to preſerve it; for if it be ſtirred after it has done working, it will be apt to grow ſtale, ſour, and become alegar.

TUPELO-TREE, in botany. See the article NYSSA.

TURBARY, denotes a right to dig turfs on another's ground; and it is likewiſe taken for the ground or place where turfs are digged, ſometimes called the turfary.

TURBINATED, is a term applied by naturaliſts to ſhells, which are ſpiral, or wreathed, conically, from a larger baſis to a kind of apex.

TURBITH, or TURPETH-ROOT, in the materia medica, the cortical part of the root of an Indian convulvulus, brought to us in oblong piece, of a brown or aſh-colour on the outſide, and whitiſh within: the beſt is pondorous, not wrinkled, eaſy to break, and diſcovering a large quantity of reſinous matter to the eye: its taſte is at firſt ſweetiſh; when chewed for a little time, it becomes acid

acid, pungent, and nauſeous. This root is a cathartic, not of the ſafeſt, or moſt certain kind: the reſinous matter in which its virtue reſides, appears to be very unequally diſtributed, inſomuch that ſome pieces, taken from a ſcruple to a dram, purge violently; whilſt others, in larger doſes, have ſcarce any effect at all. An extract made from the root, is more uniform in ſtrength, though not ſuperior, or even equal, to purgatives more common in the ſhops.

TURBITH MINERAL, a name given by chemiſts to a yellow precipitate of mercury, prepared after the following manner. Upon purified quickſilver, contained in a glaſs veſſel, pour double its weight of the ſtrong ſpirit or oil of vitriol. Heat the liquor by degrees, ſo as at length to make it boil, till a white maſs remains, which is to be thoroughly dried, with a ſtrong fire. This maſs, on the effuſion of warm water, grows yellowiſh, and falls into powder; which is to be carefully ground with the water in a glaſs mortar: then ſuffer it to ſettle, pour off the water, and waſh the powder in ſeveral parcels of freſh water, until it is ſufficiently dulcified.

This preparation is a ſtrong emetic, and operates the moſt powerfully of all the mercurials that can be ſafely given internally. Its action, however, is not confined to the primæ viæ; it will ſometimes excite a ptyaliſm, if a purgative is not ſoon taken after it. It is uſed chiefly in violent gonorrhæas, and other venereal caſes, where there is a great flux of humours to the parts: the doſe is from two grains, to ſix or eight; though there are ſome conſtitutions, which have been uſed to mercurials, that bear well even the doſe of a ſcruple. This medicine has alſo of late been recommended as the moſt effectual preſervative againſt the hydrophobia.

The waſhings of turbith mineral are by ſome externally applied for the itch, and other cutaneous foulneſſes; but in theſe caſes, though it often does ſervice, the patient muſt not be too free with it.

TURBOT, or TURBUT, in ichthyology, the Engliſh name of a ſpecies of pleuronectes, with the eyes on the right ſide, and the body ſmooth.

It grows to a conſiderable ſize, and is one of the moſt eſteemed fiſh at table.

TURCICA TERRA, Turkey earth, in the materia medica, a very fine bole or medicinal earth, dug in great plenty in the neighbourhood of Adrianople, and uſed by the Turks as a ſudorific and aſtringent; and famous among them in peſtilential diſeaſes. It is ſometimes brought over to us alſo made up into flattiſh, orbicular maſſes of two or three drams weight, and ſealed with ſome Turkiſh characters. This earth is of a ſomewhat lax and friable texture, yet conſiderably heavy, of a greyiſh, red colour, but always redder on the ſurface than within; extremely ſoft, and naturally of a ſmooth ſurface: it melts freely in the mouth, with a conſiderably ſtrong, aſtringent taſte.

TURCOISE, or TURQUOISE, *Turcheſia*, in natural hiſtory, an ore of copper, erroneouſly ranked among gems.

There are, indeed, two kinds of turquoiſe; the one a true and genuine ore of copper; the other, the bones of animals tinged to a beautiful blue colour, by having been buried in places where copper-ore has been near them.

That kind which we uſually diſtinguiſh by the name of the turquoiſe of the old rock, and which Pliny and the ancients called callais, is a true and genuine copper-ore, and is of exactly that kind in regard to this metal, that the hæmatites is to iron; it is found in the perpendicular fiſſures of the ſtrata of ſtone, which contain copper adhering to their ſides in form of a cruſt, and riſing into botryoide efloreſcences, which ſometimes ſtand ſingle, and are in bigneſs from the ſize of a pea to that of a walnut; but ſometimes happening to be placed cloſe to one another, they join and form flat cruſts or maſſes, extending, in the manner of cruſts of the hæmatites, to three, four, or more inches in breadth; in theſe the prominent part of every tubercle appearing on the ſurface, the whole ſeems a conjunction of ſemi-circular bodies of a fine blue colour joined by an intermediate ſubſtance of the ſame nature.

This kind of the turquoiſe is of a very cloſe texture and gloſſy ſurface, but very ſoft, and, when broken, ſhews the ſame cruſtated and ſtriated texture with the hæmatites; only that the ſtriæ are uſually finer, and the plates better joined. It ferments with aqua-fortis, and may be in great part diſſolved by it; and on calcining, it loſes all its colour, and becomes of a dirty white. This is produced in Perſia, and ſome other parts of the Eaſt. The Germans alſo have a botryoide copper-ore, in ſome of their mines; but it is green and much ſofter than the true turquoiſe of this kind, though this has been often produced among us alſo under the name of that gem.

The other turquoiſe is nothing more than the teeth or bones of animals, which have lain in the way of effluvia in which copper has been contained, and by this means have acquired veins and ſtreaks of a deep blue, which, on the whole being ſlightly calcined, diffuſe themſelves through all the ſubſtance, and give the fine pale blue we ſo much admire in this gem. If the fire that diffuſes this colour be a little too ſtrong, it ſends it wholly off, and leaves in place of the turquiſe only a white bone.

The turquoiſes of this laſt kind are common in France; there are mines of them there, and the people who work them are perfectly acquainted with the method of diffuſing the colour through them. Theſe are what are now uſually worn, and, when fine, are called, by many of our jewellers,

jewellers, turquoiſes of the old rock, as well as the other.

The virtues attributed to this gem are very great, but all we know of it at preſent is, that, like the other bodies that contain copper, it is a violent emetic, and not fit to be received into practice.

TURGESCENCE, or TURGESCENCY, among phyſicians, denotes a ſwelling, or growing bloated.

TURIONES, among herbaliſts, denotes the firſt young tender ſhoots, which plants annually put forth.

TURKEY, *Meleagris*, in ornithology, a genus of birds, the anterior part of the head of which is covered with a fleſhy pendulous ſubſtance; the ſides of the head alſo, and the throat, are covered with a papillous fleſhy matter, and there is a longitudinal fleſhy creſt, of a reddiſh, bluiſh, or purpliſh colour, and a ſoft ſubſtance. There is but one known ſpecies of this genus.

TURKY-EARTH. See TURCICA-TERRA.

TURMERIC, in the materia medica, the root of a plant, called by botaniſts, curcuma. See the article CURCUMA.

It is a ſmall root, of an oblong figure, uſually met with in pieces from half an inch to an inch or two in length, and at the utmoſt ſurface the thickneſs of a man's little finger; its ſurface is uneven, and riſes into knobs in many places, and the longer pieces are ſeldom very ſtraight; it is very heavy and hard to break; it is not eaſily cut through with a knife, but, when cut, leaves a gloſſy ſurface.

Its colour, externally, is a pale whitiſh grey, with ſome faint tinge of yellowneſs, and when broken, is of a fine yellow within; this colour is bright and pale, and without admixture, when the root is freſh; but in keeping, it by degrees becomes reddiſh, and at length is much like ſaffron in the cake. Thrown into water, it ſpeedily gives it a fine yellow tinge; and, chewed in the mouth, it gives the ſpittle the ſame colour. It is eaſily powdered in the mortar, and according to its different age, makes a yellow, an orange-colour, or a reddiſh powder.

It has a kind of aromatic ſmell, with ſomething of the odour of ginger in it. The taſte is acrid and diſagreeable, and has a conſiderable bitterneſs.

It is brought from the Eaſt-Indies, where they uſe it in ſauces and foods.

As a medicine, it is eſteemed aperient and emmenagogue, and of ſingular efficacy in the jaundice. But beſides theſe uſes, the glovers uſe it for dying their leather; and the turners, to give an agreeable yellow to ſeveral of their works made in the whiter woods.

TURN, in law, a court held twice a year, viz. within a month after Eaſter and Michaelmas, reſpectively, by the ſheriff of every county.

TURNADO, or TORNADO, a wind which on ſome coaſts blows all night from the ſhore.

TURNAMENT, or TOURNAMENT, a martial ſport, or exerciſe, which the ancient cavaliers uſed to perform to ſhew their bravery and addreſs.

TURNEP, *Rapa*, in botany, a genus of plants, whoſe flower conſiſts of four yellow petals, diſpoſed in the form of a croſs, and ſix erect ſubulated filaments, two of which are ſhorter than the others, and topped with erect acute-pointed antheræ: the fruit is a long taper pod, depreſſed on the ſides, having two cells which contain a number of round ſeeds.

The turnep-plant is ſo univerſally known, that a particular deſcription of it is not neceſſary: it is claſſed by Linnæus among the braſſicas, or cabbages.

There are ſeveral ſorts of turneps, as the round red or purple-topped turnep, the green-topped turnep, the yellow turnep, the black-rooted turnep, the early Dutch turnep, the French turnep, &c. which are all propagated by ſowing their ſeeds.

The green-topped turnep is moſt eſteemed by the farmers, as the root grows above ground more than the other ſorts, which renders it preferable for feeding cattle; and being the ſofteſt and ſweeteſt root, when grown large, of any of the kinds, is therefore moſt valued for the table.

All the ſorts of turneps delight in a light ſandy ſoil, not over rich; for in a ſoil which has been uſed to be manured, they are apt to grow rank and ſticky.

The common ſeaſon among the farmers, for ſowing turneps, is July; ſometimes in June and Auguſt, but not later. In Norfolk and ſome other counties, they cultivate great quantities of turneps for feeding black cattle, which turn to great advantage to their lands, for hereby they procure a good dreſſing; ſo that they have extraordinary good crops of barley upon thoſe lands, which would not have been worth the ploughing, if it had not been thus huſbanded.

When the turneps are to be fed off the ground, the cattle ſhould not be ſuffered to run over too much at a time; for if they are not confined with hurdles, to as much as is ſufficient for them one day, the cattle will ſpoil three times the quantity of turneps they can eat; ſo that it is very bad huſbandry to give them too much room: therefore the hurdles ſhould be removed forward once or twice every day. If the turneps are drawn out of the ground before the cattle, or ſheep, are turned into the new incloſure, there will be no waſte made; for they will then eat up the whole roots; whereas if they are turned upon the turneps growing, they will ſcoop the roots and leave the rinds, which being hollow, the urine of the ſheep will be lodged in them; ſo that when they are forked out of the ground, the ſheep will not eat any one of thoſe which are thus tainted.

The Dutch turnep is commonly ſown in the ſpring for culinary purpoſes, before the other ſorts come in. This is the beſt kind of turnep for ſummer uſe; but the land where they are ſown ſhould be of a moiſt nature, otherwiſe they ſoon become ſtringy, and very rank, ſo as to be unfit for uſe.

In order to ſave good turnep ſeeds, ſome of the faireſt roots ſhould be choſen in February, and planted in rows, about eighteen inches or two feet aſunder; and when their pods are formed, they ſhould be carefully guarded from the birds, otherwiſe they will ſoon devour the ſeeds, eſpecially when near ripe. When the ſeeds are ripe, the ſtems ſhould be cut, and ſpread to dry in the ſun; after which they may be threſhed out and preſerved for uſe.

Turneps are much better known in food than in medicine; they are certainly very cooling and cleanſing, and agreeably abſterge the viſcid and mucous adheſions which often nauſeate the ſtomach and diſorder the firſt paſſages; they afford a very innocent and light nouriſhment to conſtitutions extremely weakened; and the liquor preſſed out of them, when boiled, is accounted good in hectics, tartarous obſtructions, and tubercles of the lungs, in which intenſions Crato much commends them; and becauſe this liquor is manifeſtly diuretic, it is uſed to keep open and cleanſe the kidneys and their appendages. Turnep juice is alſo ſaid to be good in aſthmas, by taking a large ſpoonful in a morning faſting, for forty days together. Turneps are a wonderful pleaſant ſauce to the great quantities of fleſh we eat; for they help to attenuate and divide thoſe parts which otherwiſe would make the juice of too tough and groſs a conſiſtence to paſs readily through the veſſels in circulation.

TURNERA, in botany, a genus of plants, whoſe flower conſiſts of five plane, pointed, obverſely-cordated petals, with narrow ungues inſerted in the tube of the cup: the ſtamina are five ſubulated filaments, topped with erect acuminated antheræ: the fruit is an ovate capſule, having three valves and one cell, which contains a number of oblong obtuſe ſeeds.

TURNING, a branch of ſculpture, being the art of faſhioning hard bodies, as braſs, ivory, wood, &c. into a round or oval form, in a lathe.

Turning is performed by putting the ſubſtance to be turned upon two points as an axis, and moving it round on that axis; while an edge-tool, ſet ſteady to the outſide of the ſubſtance in the circumvolution thereof, cuts off all the parts which lie farther off the axis, and makes the outſide of that ſubſtance concentric to the axis. See LATHE.

The invention of turning ſeems to have been very ancient. Some, indeed, to do honour to the age, will have it brought to perfection by the moderns; but, if what Pliny and ſome other ancient authors relate, be true, that the ancients turned thoſe precious vaſes enriched with figures and ornaments in releivo, which we ſtill ſee in the cabinets of the curious, it muſt be owned that all that has been added in theſe ages, makes but poor amends for what we loſt of the manner of turning of the ancients.

TURNING-EVIL, in cattle, a diſeaſe that cauſes them frequently to turn round in the ſame place. It is alſo called the ſturdy.

The common remedy, recommended by Mr. Markham, is to throw the beaſt down, and bind him; then to open his ſkull, and take out a little bladder, filled with water and blood, which uſually lies near the membrane of the brain, and then gradually heal the wound.

TURNPIKE, a gate ſet up acroſs a road, watched by an officer for the purpoſe, in order to ſtop travellers, waggons, coaches, &c. to take toll of them, towards repairing or keeping the roads in repair.

In caſe any perſon ſhall drive horſes or other cattle thro' grounds adjoining to the highways, thereby to avoid the toll, they are liable to forfeit 10*s.* Or if any one aſſaults a collector of the tolls, or by force paſſes through a turnpike-gate without paying, he forfeits 5*l.* leviable by juſtices of peace; and malicioufly pulling down a turnpike is deemed felony.

TURNPIKE, is alſo uſed, in the military art, for a beam ſtruck full of ſpikes, to be placed in a gap, a breach, or at the entrance of a camp, to keep off an enemy. See CHEVAUX *de Friſe*.

TURNSOLE, *Heliotropium*, in botany. See HELIOTROPIUM.

TURPENTINE, a tranſparent ſort of reſin, flowing either naturally or by inciſion from ſeveral unctuous and reſinous trees, as the terebinthus, fir, pine, larch, &c.

We diſtinguiſh ſeveral kinds of turpentines; as that of Chio, of Venice, of Bourdeaux, of Cyprus, Straſburg, &c.

The turpentine of Chio, or Scio, which is the only genuine kind, and that which gives the denomination to all the reſt, is a whitiſh reſin, bordering a little on green, very clear, and a little odoriferous; drawn by inciſion from a tree called terebinthus, very common in that iſland, as alſo in Cyprus, and ſome parts of France and Spain.

The reſin muſt be choſen of a ſolid conſiſtence, almoſt without either taſte or ſmell, and not at all tenacious, which diſtinguiſhes it from the falſe turpentine of Venice, commonly ſubſtituted for it, which has a briſker ſmell, a bitter taſte, and ſticks much to the fingers. This turpentine of Chio is indiſputably the beſt, but its ſcarcity occaſions it to be little in uſe.

The turpentine of Venice is falſly ſo called; for, though there was a tarpentine anciently brought from Venice, yet that now ſo called comes from

Dauphine. It is liquid, of the conſiſtence of a thick ſyrup, and whitiſh; and flows either ſpontaneouſly or by inciſion, from the larix, or larch-tree, chiefly in the wood de Pilatze.

That flowing naturally, called by the peaſants bijon, is a kind of balſam, not inferior in virtue to that of Peru, for which it is frequently ſubſtituted. That drawn by inciſion, after the tree has ceaſed to yield ſpontaneouſly, is of conſiderable uſe in ſeveral arts, and it is even of this that varniſh is chiefly made. It muſt be choſen white and tranſparent, and care be taken that it be not counterfeited with oil of turpentine.

The turpentine of Bourdeaux is white, and as thick as honey. It does not ooze from the tree in the manner it is ſent to us, but is properly a compoſition, wherein, among other ingredients, is a white hard ſort of reſin, called galipot. See the article PITCH.

The turpentine of Straſburg, the produce of the abies, or ſilver fir, is that moſt commonly uſed among us, and is preferred by our people to that of Venice, which is diſtinguiſhed from it by its green hue, fragrant ſmell, and citron flavour.

The uſes of turpentine in medicine are innumerable. It is a great vulnerary, and very detergent, and as ſuch is preſcribed in abſceſſes, ulcerations, &c. It promotes expectoration, and as ſuch is preſcribed in diſeaſes of the lungs and breaſt; but it is moſt famous for clearing the urinary paſſages, and as ſuch preſcribed in obſtructions of the reins, in gonorrhœas, &c.

Oil of TURPENTINE. There are two kinds of oil drawn from turpentine, by diſtillation; the firſt, white, the ſecond red, both eſteemed as balſams proper for the cure of wounds, chilblains, &c. But they are ſo little uſed among us, that it is not eaſy to procure either of them.

What is commonly ſold under the name of oil of turpentine, or etherial oil, is only a diſtillation of the reſinous juice of the tree, freſh as it is gathered. It is uſed with ſucceſs in the cure of green wounds, as alſo by the painters, farriers, &c.

To be good, it muſt be clear and pellucid as water, of a ſtrong penetrating ſmell, and very inflammable.

TURPENTINE-TREE, *Terebinthus*, in botany, a ſpecies of piſtacia. See the articles PISTACIA and TEREBINTHUS.

TURQUOISE, or TURCOISE. See the article TURCOISE.

TURRITIS, tower-muſtard, in botany, a genus of plants, whoſe flower is tetrapetalous and cruciform, the petals are ovato-oblong, obtuſe, erect, and intire, with upright ungues: the ſtamina are awl-ſhaped and erect; and the fruit is a very long four-cornered pod, containing a great number of roundiſh emarginated ſeeds.

This genus grows wild on old walls, ruins, &c. in many parts of England.

TURUNDA, in medicine and ſurgery, denotes a tent, pellet, or pencil; or a piece of lint thruſt into a wound, ulcer, &c. See TENT, &c.

TURTLE, in ichthyology, a name given to ſome ſpecies of the teſtudo, as the hawk's-bill turtle is the teſtudo with acuminated ungues, four on the hinder as well as the fore feet; the green turtle, or the teſtudo with two ungues on the fore feet, and one on the hinder; and the long-headed turtle, or the great oval-headed teſtudo.

TURTLE-DOVE, is a ſpecies of the columba kept tame. See COLUMBA.

TUSCAN ORDER, in architecture, the firſt, ſimpleſt, and moſt maſſive of the five orders.

The Tuſcan is called the Ruſtic by Vitruvius, and M. de Cambray agrees with him, who in his parallel, ſays, it never ought to be uſed but in country houſes and palace. M. Le Clerc adds, that in the manner Vitruvius, Palladio, and ſome others, have ordered it, it does not deſerve to be uſed at all. But in Vignola's compoſition, he allows it a beauty, even in its ſimplicity, and ſuch as makes it proper, not only for private houſes, but even for public buildings, as in the piazzas of ſquares and markets, in the magazines and granaries of cities, and even in the offices and lower apartments of palaces.

The Tuſcan has its character and proportions as well as the other orders; but we have no ancient monuments to give us any regular Tuſcan pillar for a ſtandard.

M. Perrault obſerves, that the characters of the Tuſcan are nearly the ſame with thoſe of the Doric, and adds, that the Tuſcan is in effect no more than the Doric made ſomething ſtronger, by ſhortening the ſhaft of the column; and ſimpler, by the ſmall number, and largeneſs of the mouldings.

Vitruvius makes the whole height of the order fourteen modules, in which he is followed by Vignola, M. Le Clerc, &c. Serlio makes it but twelve. Palladio gives us but one Tuſcan profile, much the ſame as that of Vitruvius, and another too rich, on which ſide Scamozzi is too faulty. Hence it is, that that of Vignola, who has made the order very regular, is moſt followed by the modern architects.

Of all the orders, the Tuſcan is the moſt eaſily executed, as having neither trigliphs nor dentils, nor modillions, to cramp its intercolumns. On this account, the columns of this order may be ranged in any of the five manners of Vitruvius, viz. the pycnoſtyle, ſyſtyle, euſtyle, diaſtyle, and araeoſtyle.

TUSCAN *Order by Proportions of equal Parts.* The height of the pedeſtal, being two diameters, is divided into four, giving one to the baſe, whoſe plinth is ſeven-eights thereof, the other part is divided

vided into three, giving one to the fillet, and two to the hollow. The breadth of the die or naked, is one diameter and one-third, and the projection of the base is equal to its height; the fillet hath three-fourths thereof. The height of the corniche is half the base, being one-eighth of the whole height, and is divided into eight, giving two to the hollow, one to the fillet, and five to the band; the projection is equal to the base, and the fillet has three of these parts. Base of the column: the height is one half a diameter, and is divided into six parts, giving three to the plinth, two and a half to the torus, and half a part to the fillet; the whole projection is half of its height. The hollow, or cinctus, is one fourth of a circle, in all the orders, and belongs to the shaft of the column.

The diminishing of this column is one-fourth of the diameter, and is divided into nine, giving two and a half to the frieze of the capital, half a part to the fillet, three to the ovolo, and three to the abacus. The whole projection is one-eighth of the diameter, being perpendicular to the body of the column below, and the fillet projects equal to its height. The collerino, or necking of all the orders in general, is one of those nine parts in the capital, and the fillet half a part, the projection is one and one-fourth of these parts, and the fillet equal to its height. The height of the entablature being one diameter and three-fourths, is divided into six, giving two to the architrave, one and a half to the frieze, and two and a half to the corniche.

For the members of the architrave, divide the height into seven parts, giving two and a half to the first face, three and a half to the second, and one to the band at top. The projection is equal to the band, and the second face a third thereof. The first face of all the architraves is perpendicular to the naked of the column at the top. For the corniche, divide the height into nine, giving one and a half to the hollow, half to the fillet, one and a half to the ovolo, two to the corona, half a part to the fillet, two to the scima recta, and one the fillet. For the projections, the hollow hath two of these parts, the ovolo three and a half, the corona six, the fillet six and a half, and the whole nine being equal to the height.

TUSCAN-EARTH, in the materia medica, a yellowish, white, pure bole, considerably heavy, of a very smooth surface, not easily breaking between the fingers, but adhering slightly to the tongue, and melting very readily in the mouth. It is dug in many parts of Italy, particularly about Florence, where there is a stratum of it eight or ten feet thick, at the depth of five or six feet from the surface.

It is given as a sudorific, and esteemed a great medicine in fevers, attended with diarrhœas. See BOLES.

TUSSILAGO, coltsfoot, in botany, a genus of plants, whose flower is compound and various; the corollulæ are all hermaphrodite and tubulose, and compose the disc; and in some the female corollulæ are ligulated or wanting; the filaments in the hermaphrodites are hairy, very short, and topped with cylindraceous tubelose antheræ; the female corollulæ have a short germen, with a slender style crowned with a thick bifid stigma; the cup, which is cylindric and scaly, contains the seeds. which are single, oblong, compressed, and crowned with a hairy down. If there are any seeds following the female flowers, they are like those of the hermaphrodite.

The common coltsfoot has a long, slender, whitish, tender root, with stalks that rise to the height of a foot, which are hollow within, downp, reddish, and covered with leave, withont pedicles; these are long-pointed, placed alternately, and at the top of the stalks the flowers are produced, which being decayed, the other leaves appear, which are very large, a little angular, almost round, green above, and whitish and downy underneath; it grows in moist places, and on the borders of rivers, brooks, ponds, and ditches, and flowers in the spring.

Coltsfoot is an excellent medicine to abate the sharpness nf the humours, to cleanse ulcers of the breast, and to facilitate expectoration. There are many that are troubled with an asthma who cut the leaves small and mix it with tobacco for smoaking, and they affirm, that they find great benefit thereby; it is also thought good so used against defluxions of rheums and superfluous humidities; many account it a good cooler and healer outwardly applied.

TUTOR, in the civil law, is one chosen to look to the person and estate of children left by their fathers and mothers in their minority.

TUTOR, is also used in our universities for a member of some college or hall, who takes on him the instruction of some young students in the arts or faculties.

TUTSAN, *Androsæmum*, in botany, the English name for a species of hypericum. The root of this plant is thick, woody, perennial, furnished with long fibres, and has a resinous taste; the stalks are shrubby, rising to about two feet high; they are reddish, round, firm, woody, smooth, and send out some small branches toward the top; these and the stalks are furnished all the year with oval cordated leaves without pedicles, placed opposite by pairs at each joint; they are of a brownish green at the begenning of summer, but in autumn they are of a dark-red, and seem to be perforated with a great number of holes, but, on close examination, these are found to be small bladders full of a clear, balsamic fluid: the flowers grow on the top of the branches, and are each composed of five large yellow petals, with a number of hairy stamina, like those

thoſe of the hypericum or St. John's-wort. See HYPERICUM.

This plant appears like a ſmall ſhrub, and grows naturally in woods in ſeveral parts of England; it flowers in June. The ſeeds are ripe in autumn, and the plant may at that time be propagated by parting the roots. It is called tutſan, which ſignifies all-heal, becauſe it has been ſaid to cure all ſorts of diſorders; notwithſtanding which, it is ſeldom uſed in medicine, though it has the ſame virtues as St. John's-wort.

TUTTY, *Tutia*, a recrement of mixed metals, in which lapis-calaminaris, or zink in its metallic form, is an ingredient, collected in the furnaces where braſs is made from copper and calamine, and where the mixed metals are run. In theſe furnaces they place, under the roof and about the upper parts of the ſides, rods of iron, and ſometimes rolls of dry earth, about which the tutty is afterwards found. Therefore the tutty which we uſe in the ſhops at this time, owes its origin truly and properly to zink, which ſublimes with a very ſmall fire into a kind of flowers, and when fuſed with any other metal, flies from it in abundance under this form, and alſo frequently takes ſome part of this metal, more or leſs, up with it. Hence it is evident, that the tutty or cadmia of the ancients, muſt have been wholly different from ours, as they uſed no zink nor any of its ores in the furnace where they collected it. See ZINK and CADMIA.

Our tutty then is a hard and heavy ſemi-metallic recrement, ſometimes met with in the ſhops in thin flat pieces or flakes, but moſt abundantly in tubular cylindric pieces, reſembling ſegments of the barks of trees puſhed off from the branches without breaking; theſe are of different lengths and diameters. The fineſt tutty is that of a fine deep brown on the outſide, and of a yellowiſh tinge within; the thickeſt, brighteſt, and moſt granulated; the hardeſt to break, and that which has leaſt foulneſs among it.

Tutty is celebrated as an ophthalmic, and frequently employed as ſuch in unguents and collyria. See COLLYRIA.

It is to be prepared for uſe by heating it ſeveral times red hot, and quenching it ſuddenly in roſe or common water; then powdering it in a mortar, and finally levigating it with a little water upon a ſmooth hard marble, till there does not remain the leaſt gritty particle among it. It is then to be dropped upon a chalk-ſtone, and left to dry.

TWELFTH-DAY, or TWELFTH-TIDE, the feſtival of the Epiphany, or the manifeſtation of Chriſt to the Gentiles; ſo called, as being the twelfth day, excluſive, from the nativity, or Chriſtmas-day.

TWELVE MEN, otherwiſe called jury or inqueſt, is a number of twelve perſons, or upwards, as far as twenty-four, by whoſe oath, as to matters of fact, all trials paſs, both in civil and criminal caſes, through all courts of the common law in this realm.

TWILIGHT, *Crepuſculum*, that light, whether in the morning before ſun-riſe, or in the evening after ſun-ſet, ſuppoſed to begin and end when the leaſt ſtars that can be ſeen by the naked eye ceaſe, or begin, to appear.

TWINS, two young ones delivered at a birth, by an animal which ordinarily brings forth but one.

TWINS, in aſtronomy, the ſame with Gemini. See the article GEMINI.

TWY-BLADE, ophrys, in botany. See the article OPHRYS.

TYCHONIC SYSTEM, or HYPOTHESIS, an order or arrangement of the heavenly bodies, of an intermediate nature between the Copernican and Ptolemaic, or participating alike of them both. See COPERNICAN and PTOLEMAIC.

This ſyſtem had its name and origin from Tycho Brahe, a nobleman of Denmark, who lived in the latter part of the laſt century. This philoſopher, though he approved of the Copernican ſyſtem, yet could not reconcile himſelf to the motion of the earth; and being on the other hand convinced the Ptolemaic ſcheme could not be true, he contrived one different from either. In this the earth has no motion allowed it, but the annual and diurnal phænomena are ſolved by the motion of the ſun about the earth, as in the Ptolemaic ſcheme; and thoſe of Mercury and Venus are ſolved by this contrivance, though not in the ſame manner, nor ſo ſimply and naturally as in the Copernican ſyſtem. The Tychonic ſyſtem then ſuppoſed the earth in the center of the world, that is, of the firmament of ſtars, and alſo of the orbits of the ſun and moon; but at the ſame time it made the ſun the center of the planetary motions, viz. of the orbits of Mercury, Venus, Mars, Jupiter, and Saturn. Thus the ſun, with all its planets, was made to revolve about the earth once a year, to ſolve the phænomena ariſing from the annual motion, and every twenty-four hours, to account for thoſe of the diurnal motion. But this hypotheſis is ſo monſtrouſly abſurd, and contrary to the great ſimplicity of nature, and in ſome reſpects, even contradictory to appearances, that it obtained but little credit, and ſoon gave way to the Copernican ſyſtem.

After this ſcheme had been propoſed for ſome time, it received a correction, by allowing the earth a motion about its axis to acconnt for the diurnal phænomena of the heavens; and ſo this came to be called the ſemi-Tychonic ſyſtem. But this was ſtill void of the truth, and encumbered with ſuch hypotheſis, as the true mathematician and genuine philoſopher could never reliſh.

TYLE, or TILE, in building, a ſort of thin, factitious, laminated brick, uſed on the roofs of houſes; or, more properly, a kind of fat clayey earth

earth, kneaded and moulded, of a juſt thickneſs, dried and burnt in a kiln like a brick, and uſed in the covering and paving of houſes. See the article BRICK.

Tyles are mades, ſays Mr. Leybourn, of better earth than brick-earth, and ſomething nearer a kin to the potter's earth.

According to 17 Edward IV. the earth for tyles ſhould be caſt up before the firſt of November, ſtirred and turned before the firſt of February, and not made into tyles before the firſt of March; and ſhould likewiſe be tried and ſevered from ſtones, marle, and chalk. For the method of burning them, ſee the article BRICK.

As to the method of applying tyles, ſome lay them dry as they come from the kiln, without mortar or any thing elſe; others lay them in a kind of mortar made of loam and horſe-dung. In ſome parts, as in Kent, they lay them in moſs. See the article MORTAR.

TYLE, in aſſaying, a ſmall flat piece of dried earth, uſed to cover the veſſels in which metals are in fuſion.

TYLER, one that covers or paves with tyles. Tylers and bricklayers were incorporated 10 Eliz. under the name of maſter and wardens of the ſociety of freemen of the myſtery and art of tylers and bricklayers.

TYLWITH, in matters of heraldry and deſcent, is ſometimes uſed for a tribe or family branching out of another, which the modern heralds more uſually call the ſecond or third houſe.

TYMPAN, or TYMPANUM, in architecture, the area of a pediment, being that part which is in a level with the naked of the frieze. Or it is the ſpace included between the three corniches of a triangular pediment, or the two corniches of a circular one.

Sometimes the tympan is cut out, and the part filled with an iron lattice to give light, and ſometimes it is enriched with ſculpture in baſſo relievo.

TYMPAN, among joiners, is alſo applied to the panels of the doors.

TYMPAN *of an Arch*, is a triangular ſpace or table in the corners or ſides of an arch, uſually hollowed, and enriched ſometimes with branches of laurel, olive-tree, or oak, or with trophies, &c. ſometimes with flying figures, as fame, &c. or ſitting figures, as the cardinal virtues.

TYMPAN, among printers, a double frame belonging to the preſs, covered with parchment, on which the blank ſheets are laid in order to be printed off.

TYMPANUM, or TYMPAN, in mechanics, a kind of wheel placed round an axis or cylindrical beam, on the top of which are two levers or fixed ſtaves, for the more eaſy turning the axis, in order to raiſe a weight required. The tympanum is much the ſame with the peritrochium, but that the cylinder of the axis of the peritrochium is much ſhorter, and leſs than the cylinder of the tympanum.

TYMPANUM *of a Machine*, is alſo uſed for an hollow wheel, wherein one or more people, or other animals, walk to turn it; ſuch as that of ſome cranes, calenders, &c.

TYMPANUM, in anatomy, the middle part of the ear. See EAR.

TYMPANY, *Tympanites*, in medicine, a flatulent tumour or ſwelling of the abdomen or belly, very hard, equable and permanent, whereby the ſkin is ſtretched ſo tight, that when ſtruck it gives a ſound like that of a drum. Hoffman obſerves, that this diſeaſe has been generally accounted, both by ths ancients and moderns, a ſpecies of dropſy, but very improperly, for though it is often productive of, or complicated with an aſcites, yet it is in itſelf a perfectly diſtinct diſeaſe, and accompanied with no extravaſation of water in the abdomen; perſons who have died of it having been found, on opening the body, with the abdomen as dry as in a ſtate of health; but the ſtomach has been found, in ſome, greatly diſtended with flatulencies, and containing a viſcid humour, though in no great quantity. The inteſtines are alſo uſually found diſtended, and, as it were, pellucid, and, on being pricked, they collapſe, without the appearance of any water. And, in ſome caſes, on opening the abdomen, the whole ſwelling has ſubſided, on the excluſion of a groſs flatulence which had diſtended it. The inteſtines have, in ſome ſubjects, been found diſtended to the bigneſs of a man's thigh, in ſome parts, and in others, lower down, ſo contorted and twiſted together, that there could be no paſſage either for the wind or the excrements. It is not uncommon alſo, on diſſection, to find great numbers of worms, of the common long kind, in the inteſtines. See the article DROPSY.

A tympany, without a dropſy, is moſt incident to women after labour, when the lochia have been ſuppreſſed by colds or otherwiſe, or diſcharged in too ſmall quantities; a bad regimen during the lying-in, and the omitting to ſwathe the belly properly down, has alſo often a bad effect this way. In caſes of this kind, women find ſoon afterwards the abdomen inflated, with a conſiderable uneaſineſs, a difficulty of breathing, coſtiveneſs, and an unaccountable anxiety. Theſe are the breeding ſymptoms of the approaching tympany; and the ſame often happens after unſkilful treatment in abortions, and after the leaving a part of the lochia behind, or the injuring the uterus in delivery.

Children are alſo ſubject to tympanies, when violently afflicted with worms, and ſometimes after the meaſles and ſmall-pox; and if due care is not taken of theſe caſes, at their beginning, the ſuperior parts ſoon become extinuated, and the patient dies. Extreme

treme voracity of children alſo, and their eating great quantities of food, at a time when the ſtomach is weak, ſometimes brings on this diſorder.

The tympany is juſtly accounted one of the moſt dangerous kinds of diſeaſes, ſince the perſons afflicted with it much oftener die than recover. When it is accompanied with a dropſy, it is ſcarce ever cured; and a ſimple tympany in women and children, if neglected at firſt, degenerates into a chronic diſorder, and hardly admits of a cure. Some indeed, have gone ſo far as to ſay, they never knew a patient, afflicted with a tympany, recover; but this ſeems too raſh a judgment. That diſtention of the abdomen, which is properly called a flatulent colic, is by ſome accounted a ſpecies of tympany: but this is not naturally dangerous, and is eaſily cured, except when it is attended with ſpaſms of the viſcera; in which caſe the medicines given to reſtore the due tone of the inteſtines, are by no means proper in regard to the ſpaſms.

In curing flatulencies of the ſtomach and inteſtines, the phyſician's principal intention is to promote a diſcharge of the vapours by the anus, and to attenuate and gently carry off, by ſtool, the tough and viſcid matter which contributes to the generation of the flatulencies. For this purpoſe, firſt derivative, diſcutient, and evacuating clyſters are to be uſed, ſuch as thoſe prepared of hyſſop, clary, flowers of common and Roman chamomile, tops of yarrow, juniper-berries, and the larger carminative ſeeds, with veal broth, adding a ſufficient quantity of ſal gemmæ, ſal ammoniac, or Epſom ſalt, and the oil of chamomile. But it is to be obſerved, that one or two clyſters are not ſufficient for removing the diſorder, but they are frequently to be repeated. With theſe are to be interpoſed laxatives, poſſeſſed of a carminative, and, at the ſame time, ſomewhat of an anodyne quality. Or, if the patient is ſtrong, and the inflation a real tympanites, two parts of the extractum panchymagogum crolli, with one part of the pilulæ wildeganſi, or of the pilulæ ſtarckii, or pilulæ de ſyrace, in ſome ſpirituous carminative water, is to be exhibited.

After theſe are to be uſed medicines poſſeſſed of a moderate balſamic principle, and a volatile, oleous, and aromatic ſalt, commonly called carminatives; but the operation of theſe medicines is not to be ſo explained, as if, by their ſubtile volatile ſalt, they attenuate the matter of the flatulencies and render it thinner; but rather, becauſe, by invigorating the tone and ſyſtole of the inteſtinal coats, they hinder the ſtagnation of the flatulencies, move them from their ſeat, and render them more capable of being eaſily eliminated, or prevent the generation of new flatulencies; for, as the deſtroyed periſtaltic motion of the ſtomach and inteſtines is the principal cauſe of flatulencies, ſo all medicines which have a remarkable virtue in ſtrengthening theſe parts, are moſt proper for the removal of this diſorder.

The beſt and moſt approved of this kind, are powders prepared of the roots of wake-robin, zedoary, and white burnet; the digeſtive ſalt of ſylvius, or vitriolated tartar; cumin ſeeds, the tops of the leſſer centaury, and dried orange-peel, each a dram, and ſix drops of the genuine oil of chamomile, or of the oil of cedar, or of the oil of orange-peel; to which, if there is a ſuſpicion of an acid lodged in the primæ viæ, we may commodiouſly add crabs-eyes.

To this claſs of medicines may be referred the following liquid form: Take of the carminative water of Dorncrellius, of the waters of common chamomile and zedoary prepared with wine, each one ounce; of the ſpiritus nitri dulcis, of the pure oil of carraway, eight drops mixed with two drams of ſugar.

Nor are external remedies, ſuch as liniments, applied by way of ointment to the whole epigaſtric region, to be neglected. The principal ingredients of theſe liniments, ought to be boiled with oils of chamomile and rue, oil of nutmeg and Peruvian balſam, with which may be mixed the oils of juniper, carraway, aniſe, or cumins. But preferable to all others, the liquid balſam of life may be uſed, which when mixed with three parts of Hungary-water, and applied by way of ointment to the abdomen, or laid on with a warm linen cloth, is found of great efficacy.

TYPE, *Typus*, a copy, image, or reſemblance of ſome model.

This word is much uſed, among divines, to ſignify a ſymbol, ſign, or figure of ſomething to come; in which ſenſe it is commonly uſed with relation to antitype, which is the thing itſelf, whereof the other is a type or figure. See ANTITYPE.

TYPE *of Conſtans*, a formulary or model of faith, publiſhed by the emperor Conſtans, who being a favourer of the Monothelites, and exaſperated at the little ſucceſs which the ecthesis of his uncle Heraclius had met with, publiſhed a new formulary in the manner of an edict, in 648, forbidding all perſons to make uſe of the expreſſions "one" or "two wills in Jeſus Chriſt."

Martin I. condemned the type in the Lutheran council, anno 649, and the ſynod made a canon expreſsly againſt this heretical model; at which the emperor was ſo enraged, that he forced the pope into baniſhment. See ECTHESIS.

TYPE, among letter-founders and printers, the ſame with letter. See LETTER.

TYPE, is alſo uſed to denote the order obſerved in the intenſion and remiſſion of fevers, pulſes, &c.

TYPHA, in botany, a genus producing male and female flowers on the ſame plant, neither having any corolla; the male flowers are collected into a cylindric amentum, each conſiſting of a triphillous ſetaceous calyx, with three capillary filaments, terminated with oblong pendulous antheræ; the female flowers are numerous and collected in an amentum,

mentum, the cup is formed of downy hairs, and the fruit, which is in a cylinder, and numerous, contains ovate ſeeds crowned with down.

TYPHODES, τύφωδες, or τύφος, in medicine, a kind of ardent or burning fever, uſually attending on eryſipelaſes of any of the viſcera.

Of this diſorder, according to Hippocrates, there are five ſpecies. The firſt is a legitimate continual fever, which impairs the ſtrength, is accompanied with a pain of the belly, and a preternatural heat of the eyes, hinders the patient from looking ſteadily on any object whatſoever, and renders him unable, in conſequence of the violent pain, to ſpeak.

The ſecond ſpecies begins with a tertian or quartan fever. The patient diſcharges a great quantity of ſaliva and worms from his mouth; his eyes are painful; his feet, and ſometimes his whole body, are ſeized with ſoft ſwellings; his breaſt is now and then painful; his belly rumbles, his eyes are fierce, he ſpits a great deal, and his ſaliva ſticks to his throat.

The third ſpecies is known by intenſe pains in the joints, and ſometimes over all the body; the blood contaminated by the bile, becomes hot, and ſtagnates in the limbs.

The fourth ſpecies is known by a violent tenſion, elevation, and heat of the abdomen, ſucceeded by a diarrhœa, which ſometimes ends in a dropſy.

The fifth ſpecies is not unlike the firſt. See the article FEVER.

TYPHOIDEA, in botany, the ſame with phleum. See the article PHLEUM.

TYPHOMANIA, τυφομανια, in medicine, a diſorder of the brain, wherein the patient not being able to ſleep, though greatly inclined thereto, lies with his eyes ſhut, talks abſurdly, and flings himſelf this way and that.

The typhomania is a kind of combination of a frenzy with a lethargy, and is much the ſame with a coma vigil. See COMA.

TYPOGRAPHY, the art of printing. See the article PRINTING.

TYRANT, *Tyrannus*, among the ancients, denoted ſimply a king or monarch. But the ill uſe ſeveral perſons inveſted with that ſacred character made of it, has altered the import of the word, and tyrant now carries with it the idea of an unjuſt and cruel prince.

TYROSIS, a diſorder of the ſtomach, proceeding from milk coagulated therein.

TYTH, or TITHE. See the article TITHE.

TYTHING. See the article TITHING.

U.

VAC

U, The twentieth letter, and fifth vowel, of our alphabet, is formed in the voice by a round configuration of the lips, and a greater extruſion of the under one than in forming the letter *o*, and the tongue is alſo more cannulated. The ſound is ſhort in *curſt*, *muſt*, *tun*, *tub*; but is lengthened by a final *e*, as in *tune*, *tube*, &c. In ſome words it is rather acute than long; as in *brute*, *flute*, *lute*, &c. It is moſtly long in polyſyllables; as in *union*, *curious*, &c. but in ſome words it is obſcure, as in *nature*, *venture*, &c. This letter, in the form V, is properly a conſonant, and as ſuch is placed before all the vowels; as in *vacant*, *venal*, *vibrate*, &c. Though the letters *v* and *u* had always two ſounds, they had only the form *v* till the beginning of the fourth century, when the other form was introduced, the inconvenience of expreſſing two different ſounds by the ſame letter having been obſerved long before.

In numerals V ſtands for five; and with a daſh added at top, thus, $\bar{V}$, it ſignifies five thouſand.

In abbreviations among the Romans, V. A. ſtood for Veterani aſſignati; V. B. viri bono; V. B. A. viri boni arbitratu; V. B. F. vir bonæ fidei; V. C. vir conſularis; V. C. C. F. vale, conjux chariſſime, feliciter; V. D. D. voto dedicatur; V. G. verbi gratia; Vir. Ve. virgo veſtalis; VL. videlicet; V. N. quantum nonarum.

VACANCY, in philoſophy. See the article VACUUM.

VACANCY, in law, a poſt, or benefice, wanting a regular officer or incumbent.

VACATION, in law, is the whole time betwixt the end of one term and the beginning of another. See TERM.

VACCA MARINA, the ſea-cow, in zoology, the ſame with the thrichecus. See the article THRICHECUS.

VAC

VACCINIUM, the whortle-berry buſh, in botany, a genus of plants, whoſe flower is monopetalous and campanulated, and the edge divided into four revolute ſegments; the ſtamina conſiſts of eight filaments, topped with horned antheræ, with two awns on their back, which ſpread aſunder; the fruit is an umbilicated globoſe berry, having four cells, which contain a few ſmall ſeeds.

This genus comprehends the vitis idæa and oxycocous of Tournefort.

VACUUM, or VACUITY, in philoſophy, denotes a ſpace, empty or devoid of all matter or body.

It has been the opinion of ſome philoſophers, particularly the Carteſians, that nature admits not a vacuum, but that the univerſe is entirely full of matter: in conſequence of which opinion they were obliged to aſſert, that if every thing contained in a veſſel could be taken out, or annihilated, the ſides of that veſſel, however ſtrong, would come together; but this is contrary to experience, for the greateſt part of the air may be drawn out of a veſſel by means of the air-pump, notwithſtanding which it will remain whole, if its ſides are ſtrong enough to ſupport the weight of the incumbent atmoſphere.

Should it be objected here, that it is impoſſible to extract all the air out of a veſſel, and that there will not be a vacuum on that account; the anſwer is, that ſince a very great part of the air that was in the veſſel may be drawn out, as appears by the more quick deſcent of light bodies in a receiver when exhauſted of its air, there muſt be ſome vacuities between the parts of the remaining air; which is ſufficient to conſtitute a vacuum. Indeed, to this it may be objected by a Carteſian, that thoſe vacuities are filled with materia ſubtilis, that paſſes freely through the ſides of the veſſel, and gives no reſiſtance to the falling bodies: but, as the exiſtence of this

this materia ſubtilis can never be proved, we are not obliged to allow the objection, eſpecially ſince Sir Iſaac Newton has found, that all matter affords a reſiſtance nearly in proportion to its denſity. See the article PLENUM and CARTESIAN.

There are many other arguments to prove this, particularly the motions of the comets through the heavenly regions, without any ſenſible reſiſtance; the different weight of bodies of the ſame bulk, &c.

All the parts of ſpaces, ſays Sir Iſaac Newton, are not equally full: for if they were, the ſpecific gravity of the fluid which would fill the region of the air, could not, by reaſon of the exceeding great denſity of its matter, give way to the ſpecific gravity of quickſilver, gold, or any body, how denſe ſoever: whence neither gold, nor any other body, could deſcend in the air; for no body can deſcend in a fluid, unleſs it be ſpecifically heavier than it. But, if a quantity of matter may, by rarefaction, be diminiſhed in a given ſpace, why may it not diminiſh in infinitum? And if all the ſolid particles of bodies are of the ſame denſity, and cannot be rarified, without living pores, there muſt be a vacuum.

VACUUM BOYLEANUM, is ſometimes, though improperly, uſed to expreſs the approach to a real vacuum, by means of an air-pump.

VADE-MECUM, or VENI-MECUM, a Latin phraſe, uſed, in Engliſh, to expreſs a thing that is very handy and familiar, and which one uſually carries about with them; chiefly applied to ſome favourite book.

VADIMONIUM, in the civil-law, a promiſe, or bond, given for appearance before the judge upon a day appointed.

VAGABOND, or VAGRANT, in law. See the article VAGRANTS.

VAGINA, properly ſignifies a ſheath, or ſcabbard: and the term vagina is uſed, in architecture, for the part of a terminus, becauſe reſembling a ſheath, out of which the ſtatue ſeems to iſſue.

VAGINA, in anatomy, a large canal, formed of a robuſt and ſtrong membrane, and reaching from the external orifice, or os pudendi, in women, to the uterus.

The vagina is uſually about ſix or ſeven fingers breadth long; but is very diſtenſible, and capable of great dilatation; its orifice is narrower than any other part, and cloſed by a ſphincter-muſcle: its ſubſtance is membranaceous, and rugoſe internally, and furniſhed with abundance of nervous papillæ; and to this is owing its quick ſenſation: externally it is muſcular, whereby it is enabled to embrace the penis more cloſely in coitu. The rugæ are largeſt in maids, and eſpecially in the anterior part of the vagina; in married women they are much fainter, and ſeem as if worn down; and in women who have born children, they are almoſt entirely obliterated. Their uſe is to encreaſe the pleaſure in coitu, both to the man and to the woman; and to render the part capable of the neceſſary dilatation in parturition.

About the mouth of the vagina are found certain lacunæ, or ſmall orifices, capable of admitting a briſtle: they proceed from the glandulæ ſubſtratæ, and ſerve to ſecrete a liquor for lubricating the vagina, and for ſtimulating to venery. See the article LACUNÆ, &c.

The ſphincter, or contracting muſcle, of the vagina, is compoſed of a ſeries of muſcular fibres, ariſing from the ſphincter of the anus, and ſurrounding the orifice of the vagina, after which it is inſerted under the crura of the clitoris.

The uſe of the vagina is to receive the penis in coition, to emit from the womb the menſtrual diſcharges, the fœtus, the ſecundines, and lochia.

VAGRANTS, in law, are deſcribed to be perſons pretending to be patent-gatherers, or collectors for priſons, and wander about for that end; among which are included all fencers, bear-wards, common players of interludes, minſtrels, jüglers; all perſons pretending to be gypſies, or wandering in the habits of ſuch, or pretending ſkill in phyſiognomy, palmeſtry, or the like, or to tell fortunes; all ſuch as uſe any ſubtle craft, unlawful games or plays; or, being able in body, run away, leaving their wives or children to the pariſh; all perſons who cannot otherwiſe maintain themſelves, that loiter about and refuſe to work for the uſual wages; and all other perſons wandering abroad and begging, &c.

It is enacted, that where any ſuch vagrants ſhall be found in a pariſh, the conſtable, or other officer, is immediately to apprehend them, and carry them before ſome juſtice of the peace, who ſhall examine the perſons on oath, as to their condition, and places of abode; and thereupon order them to be ſent by paſs to the place of their laſt legal ſettlement; or if that cannot be known, to the place of their birth. The juſtice is to give the conſtable a certificate aſcertaining how, and in what manner, they ſhall be conveyed, &c.

And juſtices of the peace, in their ſeſſions, have power to appoint rates for paſſing of vagrants, at ſo much per mile. All conſtables are to make ſearches for theſe people before every quarter-ſeſſions; and in caſe any perſons permit vagrants to lodge in their houſes, barns, or out-houſes, and do not carry them before the next juſtice, or give notice to ſome conſtable, or other pariſh-officer, ſo to do, they ſhall forfeit a ſum not above forty ſhillings, or under ten ſhillings. Alſo, if any charge be brought upon any place by means thereof, the ſame may be levied by diſtreſs and ſale of the offender's goods; for want of which he ſhall be committed to the houſe of correction, and there ſet to hard labour for three months.

VAGUM, or PAR VAGUM, in anatomy, the eighth pair of the nerves arising from the medulla oblongata. See NERVE.

VAIR, in heraldry, a kind of fur, consisting of divers little pieces, argent and azure, resembling a Dutch U, or a bell-glass.

Vairs have their point azure opposite their point argent, and the base argent to the base azure.

VAIRY, VAIRE, VERRY, or VARRY, in heraldry, expresses a coat, or the bearings of a coat, when charged or chequered with vairs; and hence, vairy-cuppy, or vairy-tassy, is a bearing composed of pieces representing the tops of crutches.

VALANTIA, crosswort, in botany, a genus of plants, producing male and hermaphrodite flowers; the male flower is monopetalous, plane, and the limb divided into three or four ovate pointed segments; the corolla of the hermaphrodite flower is like the male, and contains four filaments, topped with small antheræ; the pericarpium is coriaceous, compressed, and reflexed, and contains one globose seed.

This genus is the same with the cruciata of Tournefort.

VALENTINIANS, in church-history, a sect of Christian heretics, who sprung up in the second century, and were so called from their leader Valentinus.

The Valentinians were only a branch of the Gnostics, who realized or personified the platonic ideas, concerning the Deity, whom they called Pleroma, or Plenitude. Their system was this: the first principle is Bythos, i. e. depth, which remained many ages unknown, having with it Ennoe, or thought, and Sige, or silence; from these sprung the Nous, or intelligence, which is the only son, equal to, and alone capable of comprehending, the Bythos; the sister of Nous they called Alatheia, or truth: and these constituted the first quaternity of æons, which were the source and original of all the rest: for Nous and Aletheia produced the World and Life; and from these two proceeded Man and the Church. But besides these eight principal æons, there were twenty-two more, the last of which, called Sophia, being desirous to arrive at the knowledge of Bythos, gave herself a great deal of uneasiness, which created in her Anger and Fear, of which was born Matter. But the Heros, or bounder, stopped her, preserved her in the Pleroma, and restored her to her perfection. Sophia then produced the Christ and the Holy Spirit, which brought the æons to their last perfection, and made every one of them contribute their utmost to form the Saviour. Her Enthymese, or thought, dwelling near the Pleroma, perfected by the Christ, produced every thing that is in the world, by its divers passions. The Christ sent into it the Saviour, accompanied by angels, who delivered it from its passions, without annihilating it: from thence was formed corporeal matter. And in this manner did they romance, concerning God, nature, and the mysteries of the Christian religion.

VALERIAN, *Valeriana*, in botany, a genus of plants, whose flower consists of a single petal in form of a tube, prominent in its inferior part, and containing a honey juice; the stamina are three erect subulated filaments, topped with roundish antheræ; the fruit is a deciduous coronated capsule, containing an oblong seed. These characters are general, but there are considerable variations among the different species.

The common garden valerian has a wrinkled root, which grows near the surface of the ground, and is furnished with fibres which cross each other; the stalks rise three feet high, and are slender, round, smooth, hollow, branched, and furnished with leaves placed opposite to each other in pairs; some are smooth and entire, while others are cut deeply on each side; they are smooth, and of a pale green colour; the flowers grow in umbels on the tops of the stalks and branches, and are of a purplish white, with a sweet smell not unlike that of jasmine: it is cultivated in gardens, and propagated by parting the roots either in spring or autumn.

The wild valerian is the sort preferred for medicinal purposes; it grows on dry chalky land and shady places in divers parts of England, and flowers in May or June: the root is bitter, styptic, and has a disagreeable aromatic smell. It is recommended against the epilepsy, and is sudorific as well as hysteric; it is accounted good for the asthma, and all kinds of convulsive disorders: it may be taken in decoction, from two drams to half an ounce; and in substance, from one dram to two. The season for taking it up is in the spring, before the branches appear, and it should be dried in the shade.

Greek VALERIAN, *Polemonium*, in botany. See the article POLEMONIUM.

VALET, in the manege, a stick armed at one end with a blunted point of iron, to prick and aid a leaping horse.

VALETUDINARY, *Valetudinarius*, among medical writers, denotes a person of a weak and sickly constitution, and frequently out of order.

VALID, in law, an appellation given to acts, deeds, transactions, &c. which are cloathed with all the formalities requisite to their being put into execution, and to their being admitted in a court of justice. See ACT, DEED, &c.

VALLAR-CROWN, *Vallaris Corona*, in Roman antiquity, the same with that otherwise called castrensis. See CROWN.

VALLISNERIA, in botany, a genus producing male and female flowers on distinct plants; the male corolla is monopetalous and tripartite, and contained in a spatha, with two erect filaments topped with single antheræ: the corolla of the female flower consists of three very narrow, truncated, linear petals, with a patent pointed nectarium: the fruit is

a long cylindric capsule, with one cell, containing a number of ovate seeds affixed to the sides of the capsule.

VALUE, *Valor*, in commerce, denotes the price or worth of any thing: hence the intrinsic value denotes the real and effective worth of a thing, and is used chiefly with regard to money, the popular value whereof may be raised and lowered at the pleasure of the prince; but its real or intrinsic value, depending wholly on its weight and fineness, is not at all affected by the stamp or impression thereon.

Value in bills of exchange, is used to signify the nature of the thing (as ready money, bills, debts, merchandizes, &c.) which is given, as it were, in exchange, for the sum specified in the bill.

From four different manners of expressing this value, some distinguish four kinds of bills of exchange. The first bears value received, simply and purely, which comprehends all kinds of value; the second, value received in money or merchandize; the third, value of myself; and, the fourth, understood. See BILL.

VALVE, *Valvula*, in hydraulics, pneumatics, &c. is a kind of lid, or cover, of a tube or vessel, so contrived as to open one way; but which, the more forcibly it is pressed the other way, the closer it shuts the aperture; so that it either admits the entrance of a fluid into the tube or vessel, and prevents its return; or admits its escape, and prevents its re-entrance. See PUMP.

Mr. Belidore has invented a new kind of valves, the description of which may not be unacceptable to the reader: see plate LXXXIX. where fig. 1. represents a round plate of brass, one half of which is chamfered upwards, and the other half downwards. The part CAD, which is greater by one twelfth than the other part B, is tapered on the under side from L to A, as is more evident in fig. 5. where the same letters are used.

The part B, is tapered on the upper side, as may also be seen in fig. 7. at BM.

On the upper side of this plate, nearer B than the center G, is screwed on an axis EHF, on which the plate turns.

Fig. 2. shews how this axis is fastened to the plate. Fig. 3. represents the box or bed of the valve, chamfered downward on all the semi-circular side L, to receive the part AL, of fig. 1. and the other part B, quite to AA, where the pivots of the axis rest, is chamfered upwards, to receive the part B, of fig. 1. coming up against it. From these chamfered edges on the inside, this bed of the valve spreads into a flat ring, to be pinched between the flaunches of the pipes, which are screwed together, to make all tight.

Fig. 4. represents the section of this bed; OP being its upper part chamfered downwards, to receive GLA, the greater part of the valve of fig. 1. falling upon it; and QR chamfered upwards, receives the smallest part B, of fig. 1. rising against it, as it shuts.

The valve thus shut in its bed, is represented in fig. 5. where it may be observed, that the pivots of the axis are kept in their places by semi-circular bridles, that go over them at C and D.

The section of the same valve shut, may be seen in fig. 6. where MBHG, represents the lower and lesser part of the valve shut, and applied upwards to the under part of the bed at QR; and LAGH represents the greater part of the valve shut and applied downwards to the bed OP. K shews one of the bridles pinned, which holds down the pivots, or ends of the axis.

Fig. 7. shews the valve open, and the manner of its play; where all the passage being open between QK and BIL, and between PO and MHA, it is plain that here is the greatest waterway possible. Now, when the valve shuts, the end BM moves in the direction of the pricked curve-line MQ, and the end LA in the direction of the pricked line LO.

When the water is coming downwards, it must push hard on the part GAL, in fig. 1, 5, 6, and and 7, and thereby make the part BH to rise, by which means the valve will be close shut. But when the water comes upwards, as it presses with most force on the surface GA, the part HB will come down, and the valve will immediately open.

VALVE, in anatomy, a thin membrane applied on several cavities and vessels of the body, to afford a passage to certain humours going one way, and prevent their reflux towards the place from whence they came.

The veins and lymphatics are furnished with valves, which open towards the heart, but keep close towards the extremities of those vessels; that is, they let the blood and lymph pass towards the heart, but prevent their returning towards the extreme parts from whence they came.

VANILLA, in botany, a genus of plants, whose flower consists of five oblong patent petals, with a turbinated nectarium, tubulated at the base: the stamina are two very short filaments, sitting on the pistillum, and the antheræ are fixed to the upper lip of the nectarium: the fruit is a very long, taper, fleshy pod, including many minute seeds.

This genus is called, by Linnæus, epidendrum.

The vanilla-plant has a trailing stem, which, like ivy, fastens itself to whatever tree grows near it, by small fibres or roots produced at every joint, which fasten to the bark of the tree, and by which the plants are often nourished, when they are cut or broke off above the roots. The leaves are like those of laurel, but not quite so thick; they are produced by pairs alternately at every joint, and are of a lively green colour on the upper side, but paler underneath: the flowers are of a greenish yellow colour, mixed

mixed with white: the ſeeds are black and ſhining, and of a ſub-acrid, fat, aromatic taſte, with a ſmell like the balſam of Peru.

It is brought from Peru and Mexico, and grows in great plenty in the Bay of Campeachy: the fruit are only uſed in England as an ingredient in chocolate, to which it gives a pleaſant flavour, to ſome palates, but to others it is diſagreeable. The Spaniſh phyſicians in America, uſe it in medicine, and eſteem it grateful to the ſtomach and brain, for expelling wind, to provoke urine, to reſiſt poiſon, and cure the bite of venomous animals.

VAPOUR, *vapor*, in philoſophy, the moiſt and moſt volatile particles of bodies, ſeparated by heat, and raiſed into the atmoſphere.

That vapours are raiſed from the ſurface of water, and moiſt bodies, by the action of the ſun's heat, is agreed on by all: but the manner in which this is done, continues ſtill a controverted point among philoſophers. If we conſult a Carteſian upon this head, he immediately tells us, that ſmall particles of water being formed into hollow ſpheres by the ſun's heat, filled with their materia ſubtilis, and by that means becoming lighter than air, are eaſily buoyed up in it: but as this materia ſubtilis is only a fiction, this ſolution is not to be regarded.

Dr. Nieuwentyt, and ſeveral other philoſophers who maintain, that fire is a particular ſubſtance diſtinct from other matter, account for the formation and aſcent of vapours thus: they ſay, that the rays of the ſun, or particles of fire ſeparated from them, adhering to particles of the water, make up little bodies, lighter than an equal bulk of air; which, therefore, by the laws of hydroſtatics, will aſcend in it, till they come to an height where the air is of the ſame ſpecific gravity with themſelves; and that rain is produced by the ſeparation of the particles of the fire from thoſe of the water; which laſt, being then left without ſupport, can no longer be ſuſtained by the air, but falls down in drops of rain.

This opinion is liable to the following difficulties: firſt, fire has never been yet proved to be a diſtinct element, or a particle ſubſtance; and the change of weight in bodies in chemical preparations, heretofore thought to ariſe from the adheſion of particles of fire, is found to proceed from the adheſion of particles of air.

Secondly, ſhould the above-mentioned ſuppoſition be allowed, the fiery particles, which are joined to the watery ones to buoy them up, muſt be conſiderably large, or elſe a very great number muſt fix upon a ſingle particle of water; and then a perſon, being on the top of a hill in the cloud, would be ſenſible of the heat, and find the rain, produced from that vapour, much colder than the vapour itſelf: whereas the contrary is evident to our ſenſes; the tops of hills, though in the clouds, being much colder than the rain which falls below.

Beſides, the manner in which the particles of water ſhould be ſeparated from thoſe of the fire, ſo as to fall in rain, is not eaſily to be conceived.

The moſt generally received opinion is, that by the action of the ſun on the ſurface of the water, the aqueous particles become formed into bubbles, filled with a flatus, or warm air, which renders them ſpecifically lighter than common air, and makes them riſe therein, till they meet with ſuch as is of the ſame ſpecific gravity with themſelves. But Mr. Rowning aſks, firſt, how comes the air in the bubbles to be ſpecifically lighter than that without, ſince the ſun's rays, which act upon the water from whence they are raiſed, are equally denſe over all its ſurface?

Secondly, if it could be poſſible for rarer air to be ſeparated from the denſer ambient air, to form the bubbles (as bubbles of ſoaped water are blown up by warm air from the lungs, whilſt the ambient air is colder and denſer) what would hinder the external air from reducing that, which is incloſed in the bubbles immediately to the ſame degree of coldneſs and ſpecific gravity with itſelf (cold being readily communicated through ſuch thin ſhells of water); by which means the bubbles would become ſpecifically heavier then the circumambient air, and would no longer be ſupported therein, but fall down, almoſt as ſoon as they were formed?

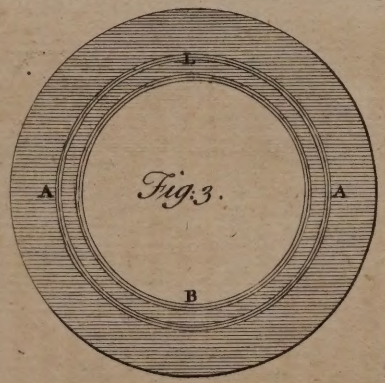
Thirdly, if we ſhould grant all the reſt of the ſuppoſition, yet the following difficulty will ſtill remain. If clouds are made up of bubbles of water filled with air, why do not theſe bubbles always expand, when the ambient air is rarefied, and preſſes leſs upon them than it did before; and why are they not condenſed, when the ambient air is condenſed by the accumulation of the ſuperior air? But if this condenſation and rarefaction ſhould happen to them, the clouds would always continue at the ſame height, contrary to obſervation; and we ſhould never have any rain.

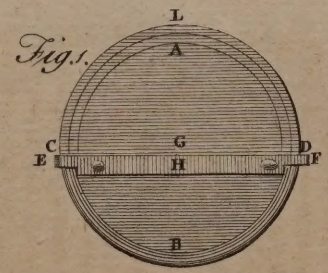
The two laſt opinions are more largely examined by Dr. Deſaguliers in the Philoſophical Tranſactions, N° 407. After which, he endeavours to eſtabliſh one of his own.

He obſerves, with Sir Iſaac Newton, that when by heat or fermentation the particles of a body are ſeparated from the contact, their repulſive force grows ſtronger, and the particles exert that force at greater diſtances; ſo that the ſame body ſhould be expanded into a very large ſpace, by becoming fluid; and may ſometimes take up more than a million of times the room it did in a ſolid and incompreſſible ſtate. "Thus, ſays he, if the particles of water are turned into vapour, by repelling each other ſtrongly, and repel air more than they repel each other; aggregates of each particles, made up of vapour and vacuity, may ariſe in air of different denſities, according to their own denſity depending on their degree of heat." He obſerves farther, that heat acts more powerfully on

water,

Belidor's New Valve.





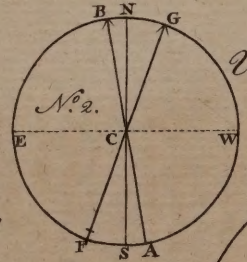
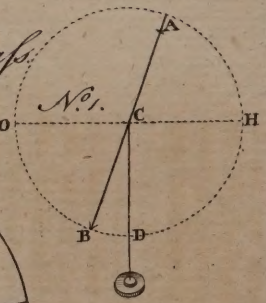
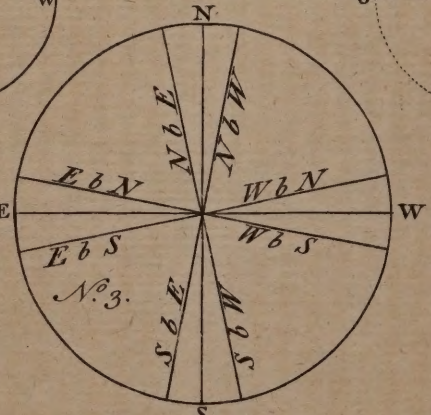
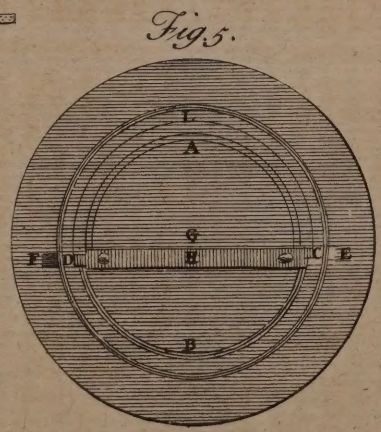
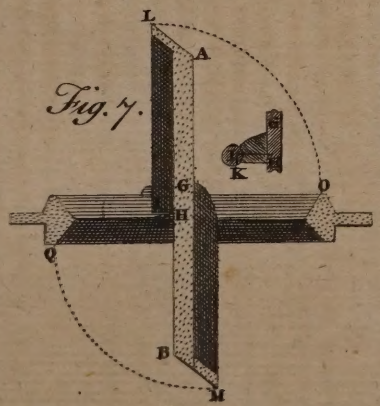


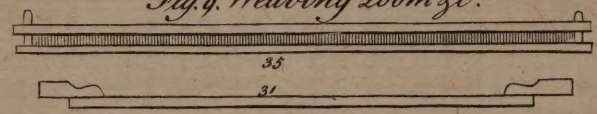
Fig. 8.
Variation of the Compass.

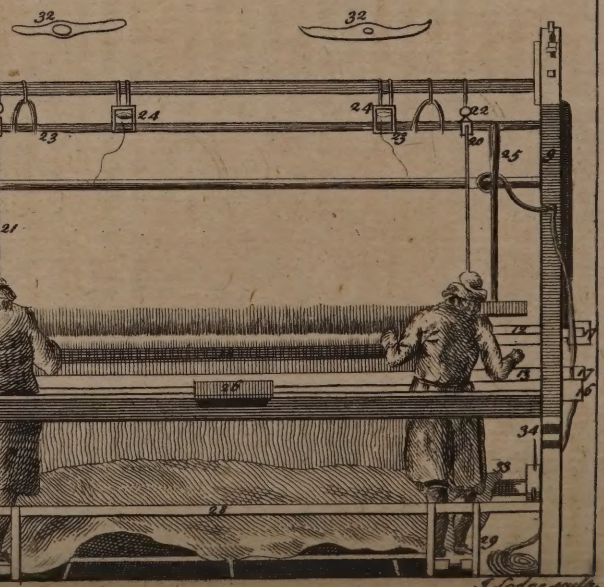












S. Lodge sculp.

water, than on common air; for that the same degree of heat, which rarefies air two-thirds, will rarefy water near fourteen thousand times, changing it into steam or vapour, as it boils it. And in winter, that small degree of heat, which, in respect of our bodies, appears cold, will raise a steam or vapour from water, at the same time that it condenses air. Lastly, he observes, that the density and rarety of this vapour depends chiefly on its degree of heat, and but little on the pressure of the circumambient air. From all which he infers, that the vapour being more rarefied near the surface of the earth, than the air is there by the same degree of heat, must necessarily be buoyed up into the atmosphere; and since it does not expand itself much, though the pressure of the incumbent air grows less, at length it finds a place where the atmosphere is of the same specific gravity with itself, and there floats, till, by some accident or other, it is converted again into drops of water, and falls down in rain.

VAPOURS, in medicine, a disease properly called hypo, or the hypochondriacal disease, and in men, particularly, the spleen. See HYPOCHONDRIAC PASSION.

VARI, in medicine, little hard and ruddy tumours, which frequently infest the faces of young persons of a hot temperament of body; for curing which, cathartics, and a cooling diluting diet are most proper.

VARIABLE QUANTITIES, in geometry and analytics, denotes such as are either continually increasing or diminishing; in opposition to those which are constant, and remaining always the same.

VARIANCE, in law, is an alteration of something formerly laid in a plea: but where a plea is good in substance, it is held, that a small variance shall not hurt it. Where the defendant pleads variance between a writ and declaration, he must crave oyer of the writ before he shall take any advantage thereof; and this is, because the writ and the declaration are not upon the same roll: it is likewise observed, that if in one roll a declaration is entered as in debt, and in another as in trespass, this is such a variance, that if the plaintiff has judgment it shall be reversed.

By the 16 and 17 Car. II. c. 8. all variances, &c. that are not against the right of the matter of the suit, shall be amended.

VARIATION, in geography and navigation, is the deviation of the magnetical needle, in the mariner's compass, from the true north point, towards either the east or west; or it is an arch of the horizon, intercepted between the meridian of the place of observation and the magnetic meridian. See the article NEEDLE.

The cause of this variation of the needle has remained hitherto without any demonstrative discovery; yet since its declination, and inclination (or dipping) do both of them manifestly indicate the cause to be somewhere in the earth, it has given occasion to philosophers to frame hypotheses for a solution, which make the earth a large or general magnet or loadstone, of which all the lesser ones are but so many parts or fragments, and being possessed of the same virtue, will, when left to move freely, have the same disposition and similarity of position, and other circumstances.

The most considerable of these hypotheses is that of the late sagacious Dr. Halley, which is this: the globe of the earth is one great magnet, having four magnetical poles or points of attraction, near each pole of the equator two; and that in those parts of the world which lie near adjacent to any one of those magnetical poles, the needle is chiefly governed thereby, the nearest pole being always predominant over the more remote one. Of the north poles, that which is nearest to us, he supposes to be in the meridian of the land's-end, which governs the variations in Europe, Tartary, and the North-sea; the other he places in a meridian passing through California, about 15° from the north pole of the world, which governs the needle in North America, and the oceans on either side. In like manner he accounts for the variations in the southern hemisphere. See Phil. Trans. N° 148.

The variation of the needle from the north and south points of the horizon, not being the same, but variable in different years, and in a diverse manner in different parts of the earth, made the doctor farther conjecture, that two of the magnetic poles were fixed, and two moveable; and in order to make this out, he supposes the external part of the earth to be a shell or cortex, containing within it a magnetic moveable nucleus of a globular form, whose center of gravity is the same with that of the earth, and moveable about the same axis.

Now, if the motions of both the shell and nucleus were the same, the poles of each would always have the same position to each other; but he supposes the motion of the nucleus to be a very small matter less than that of the shell, which yet is scarce sensible in 365 revolutions; and, if so, the magnetic poles of the nucleus will by slow degrees change their distance from the magnetic poles of the shell, and thus cause a variation in that needle's variation, which is governed by the moveable pole of the nucleus, while that variation which respects the fixed poles of the magnetic shell remains more constant; as in Hudson's-bay the change is not observed to be near so fast as in these parts of Europe.

What seems a little strange is, that the doctor has no where undertook to account for the dipping of the needle by this hypothesis; though the invention of this (by Mr. Blagrave) was before that of the change of the needle's variation (by Mr. Gellibrand); nor does it appear which way this phænomenon is explicable by it. But we have not yet so many accurate observations of the needle's inclination as we

have of its variation, which is its only usual property. By several experiments Mr. Graham has very accurately made, it appears, that the quantity of the needle's inclination to the horizontal line, was an angle of about 74 or 75 degrees: that is, suppose A B (plate LXXXIX. fig. 8. N° 1.) a touched needle supported on the point C, of the pin C D, it will remain an angle A C H, or B C O, with the horizontal line H O of 74 or 75 degrees.

The variation of the needle has within a century past undergone a remarkable alteration; for at London it was observed by Mr. Burrows, in the year 1580, to be 11° 15′ east; that is, if N. S. (fig. 8. N° 2.) represent the north and south points of the horizon, and E. W. the east and west points, the needle then had the situation A B, so that the arch B N = 11° 15′. After that, in the year 1622, it was observed by Mr. Gunter to be but 6° east. In the year 1634, Mr. Gellibrand observed it to be 4° 5′ east. In 1657, it was observed by Mr. Bond to be nothing at all; that is, the needle placed itself in the situation S. N. and pointed directly to the north. After this, in the year 1672, Dr. Halley observed it to be 2° 30′ westward; and again, in the year 1692, he found it 6° west. Since then, in the year 1722, Mr. Graham, by most accurate experiments, found it to be 14° 13′; and at present it is between 15° and 16°; and in some places it is found 18° westward.

The variation of the declination and inclination of the needle is variable, and subject to no regular computation. What the quantity of both sorts of variation is in the several parts of the world, is shewn in Dr. Halley's map of the world, improved from the observations of Mr. Pound.

If the sun's true amplitude or azimuth, found by calculation, agree with the magnetic amplitude or azimuth, found by observation, it is evident there is no variation: but if they disagree, and the true and observed amplitudes, at the rising or setting of the sun, be both of the same name; that is, either both north, or both south, their difference is the variation: whereas, if they be of different names, i. e. one north and the other south, their sum is the variation. Again, if the true and observed azimuths be both of the same name, i. e. both east or both west, their difference is the variation; but if they be of different names, their sum is the variation: and to know whether the variation be easterly or westerly, observe the following general rule; let the observer's face be turned towards the sun, then if the true amplitude or azimuth be to the right-hand, the variation is easterly; but if to the left, westerly. To illustrate this, let N E S W. (fig. 8. N°. 3.) represent a compass; and suppose the sun is really E b S at the time of observation, but the observer sees him off the east point of the compass, and so the true amplitude or azimuth of the sum is to the right of the magnetic, or observed: here it is evident, that the E b S point of the compass ought to lie where the east point is, and so the north where the N b W is; consequently the north point of the compass is too far east, i. e. the variation in this case is easterly. The same will hold when the amplitude or azimuth is taken on the west-side of the meridian.

Again, let the true amplitude or azimuth be to the left hand of the observed; thus suppose the sun is really E b N at the time of observation, but the observer sees him off the east point of the compass, and so the true amplitude or azimuth to the left of the observed: here it is evident, that the E b N point of the compass ought to stand where the east point is, and so the north where the N b E point is; consequently, the north point of the compasses lies a point too far westerly, so in this case the variation is west. The same will hold when the sun is observed on the west side of the meridian.

Suppose the sun's true amplitude at rising is found to be E. 14° 20′ N. but by the compass it is found to be E. 26° 12′ N. Required the variation, and which way it is.

Since they are both the same way, therefore,

from the magnetic amplitude	—	E. 26° 12′ N.
take the true amplitude	— —	E. 14° 20′ N.
and there remains the variation	—	11 52 E.

which is easterly, because in this case the true amplitude is to the right of the observed.

VARIATION *of the Moon*, in astronomy, is the third inequality observed in that planet's motion. See the article MOON.

VARIATION *of the Variation*, is the change in the declination of the needle, observed at different times in the same place.

VARIATION *of Quantities*, in algebra. See the article COMBINATION.

VARIATION *of Curvature*, in geometry, is used for that inequality or change, which happens in the curvature of all curves, except the circle; and this variation or inequality constitutes the quality of the curvature of any line.

Sir Isaac Newton makes the index of the inequality or variation of curvature to be the ratio of the fluxion of the radius of curvature to the fluxion of the curve; and Mr. Mac Laurin, to avoid the perplexity that different notions, connected with the same terms occasion to learners, has adapted the same definition; but he suggests, that this ratio gives rather the variation of the ray of curvature, and that it might have been proper to have measured the variation of curvature, rather by the ratio of the fluxion of curvature itself to the fluxion of the curve; so that the curvature being inversely as the radius of the curvature, and consequently its fluxion as the fluxion of the radius itself directly, and the square of the radius inversely, its variation would have been directly, as the measure of it, according to Sir Isaac's de-

definition, and inverſely as the ſquare of the radius of curvature.

VARIATION, in muſic, is underſtood of the different manners of playing or ſinging a tune or ſong, whether by ſubdividing the notes into ſeveral others of leſſer value, or by adding graces, &c. in ſuch manner, however, as that one may ſtill diſcern the ground of the tune through all the enrichments; which are called embroideries.

VARICIFORMES PARASTATÆ, in anatomy, a name which ſome authors give to two veſſels near the bladder, by reaſon of their many turnings, ſerving to work and prepare the ſeed the better. See DEFERENTIA VASA.

VARIEGATION, among botaniſts and floriſts, the ſtreaking and diverſifying the leaves of plants, and the petals of flowers, with ſeveral colours.

Thoſe leaves whoſe middles are variegated with yellow or white, in ſpots, are called bloached; as in ſeveral varieties of holly: but when the leaves are edged with either colour, they are called ſtriped plants.

All the different ſorts of variegation in plants were at firſt accidental, being no more than a diſtemper in the plant, which, being obſerved, has been cheriſhed by impoveriſhing the ſoil in which they grow, by which method their ſtripes are rendered more laſting and beautiful; but whatever ſome perſons have affirmed of ſtriping plants by art, there does not appear any foundation for ſuch aſſertion, unleſs in woody ſhrubs and trees, which may be variegated by putting in a bud or graft taken from a variegated plant, where, although the buds ſhould not grow, yet if they keep freſh but a few days, they will often communicate their miaſma to the ſap of the tree into which they were budded; ſo that, in a ſhort time after, it has appeared very viſible in the next adjoining leaves, and has afterwards ſpread over the greateſt part of the tree; but in ſuch plants as are herbaceous, where this operation cannot be performed, there is no way yet aſcertained whereby this ſtriping can be effected by art.

That this ſtriping proceeds from the weakneſs of the plant, is evident, ſince it is always obſerved, that, whenever plants alter thus in the colour of their leaves, they do not grow ſo large as before, nor are they ſo capable of enduring cold; ſo that many ſorts of plants, which are hardy enough to ſurvive the cold of our climate in the open air, when in their natural verdure, require to be ſheltered in the winter, after they are become variegated, and are ſeldom of ſo long continuance; which is a plain proof of its being a diſtemper in the plants, ſince, whenever they become vigorous, this ſtriping is rendered leſs viſible, or entirely diſappears, eſpecially if the plants are only bloached.

With ſome plants the venom of this morbid matter is ſuch, that it not only tinges the leaves, but alſo the bark and fruit; as in the orange, pear, &c. whoſe bark and fruit are ſtriped in the ſame manner as their leaves.

The different colours which appear in flowers alſo proceed from the ſame cauſe; for the various colours which we ſee in the ſame flowers, are occaſioned by the ſeparation of the nutritive juice of plants, or from the alteration of their parts, whereby the ſmaller corpuſcles, which are carried to the ſurfaces of the flower-petals, are of different forms, and thereby reflect rays of light in different proportions, whereby we have thoſe various appearances of of colour.

Of flowers which are variegated, none are more beautiful than thoſe of the auricula, carnation, and tulip. See AURICULA, &c.

VARIOLÆ, the ſmall-pox, in medicine. See the article POX.

VARIOLUM, or *Cum Notis* VARIOLUM, in matters of literature, denotes an edition of a claſſic author, with notes of divers authors thereupon: theſe editions are generally moſt valued.

VARIX, in medicine, the dilatation of a vein, ariſing from the too great abundance or thickneſs of the blood; the cure of which is to be attempted by evacuations, as phlebotomy and cathartics; as alſo by external applications, as diſcutient fomentations, cataplaſms, embrocations, &c. or where the caſe grows dangerous, by inciſion.

VARNISH, or VERNISH, a thick, viſcid, ſhining liquor, uſed by painters, gilders, and various other artificers, to give a gloſs and luſtre to their works; as alſo to defend them from the weather, duſt, &c.

There are ſeveral kinds of varniſhes in uſe; as the ſiccative or drying varniſh, made of oil of aſpin, turpentine, and ſandarach melted together. White varniſh, called alſo Venetian varniſh, made of oil of turpentine, fine turpentine, and maſtic. Spirit of wine varniſh, made of ſandarach, white amber, gum elemi, and varniſh; ſerving to gild leather, picture-frames, &c. withal. Alſo the gilt-varniſh, china varniſh, common varniſh, &c.

1. To make the white varniſh: take gum ſandarach, of the cleareſt and whiteſt ſort, eight ounces; gum maſtic, of the cleareſt ſort, half an ounce; of ſarcocolla, the whiteſt, three quarters of an ounce; Venice turpentine, an ounce and a half; benzoin, the cleareſt, one quarter of an ounce; white roſin, one quarter of an ounce; gum animæ, three quarters of an ounce: let all theſe be diſſolved, and mixed in the following manner:

Put the ſarcocolla and roſin into a little more ſpirits than will cover them to diſſolve; then add the benzoin, gum animæ, and Venice turpentine, into either a glaſs or glazed earthen veſſel, and pour on as much ſpirits as will cover them an inch; then put the gum maſtic into a glaſs or glazed veſſel, and pour ſtrong ſpirits upon it, covering it alſo about an inch thick, to diſſolve it rightly; then put your gum

gum elemi into a diſtinct veſſel as before, and cover it with ſpirits to diſſolve.

For this purpoſe, you need only break the roſin a little, and powder the gum animæ, ſarcocolla, and benzoin.

Let all ſtand three or four days to diſſolve, ſhaking the glaſſes, &c. two or three times a day, and afterwards put them all together into a glazed veſſel, ſtirring them well, and ſtrain the liquor and gums gently, beginning with the gums, through a linen cloth.

Then put it into a bottle, and let it ſtand a week before you uſe it, and pour off as much of the clear only, as you think ſufficient for preſent uſe.

2. The white amber varniſh is thus made according to Mr. Boyle: take white roſin, four drams, melt it over the fire in a clean glazed pipkin; then put into it two ounces of the whiteſt amber you can get, finely powdered.

This is to be put in by a little and a little, gradually, keeping it ſtirring all the while with a ſmall ſtick, over a gentle fire, till it diſſolves, pouring in now and then a little oil of turpentine, as you find it growing ſtiff; and continue ſo to do till all your amber is melted.

But great care muſt be taken not to ſet the houſe on fire, for the very vapours of the oil of turpentine will take fire by heat only; but if it ſhould happen ſo to do, immediately put a flat board or wet blanket over the fiery pot, and by keeping the air from it, you will put it out, or ſuffocate it.

Therefore it will be beſt to melt the roſin, in a glaſs of a cylindric figure, in a bed of hot ſand, after the glaſs has been well annealed, or warmed by degrees in the ſand, under which you muſt keep a gentle fire.

When the varniſh has been thus made, pour it into a coarſe linen bag, and preſs it between two hot boards of oak or flat plates of iron; after which it may be uſed with any colours in painting, and alſo for varniſhing over when painted.

But for covering gold, you muſt uſe the following varniſh: mean time, it is to be obſerved, that when you have varniſhed with white varniſh, you may put the things varniſhed into a declining oven, which will harden the varniſh.

3. A hard varniſh that will bear the muffle, may be thus made: take of colophony, an ounce; ſet it over the fire in a well-glazed earthen veſſel, till it is melted; then by little and little, ſtrew in two ounces of powder of amber, keeping it ſtirring all the while with a ſtick; and when you perceive it begin to harden or reſiſt the ſtick, then put in a little turpentine oil, which will thin and ſoften it immediately; then put in two ounces of gum copal, finely powdered, ſprinkling it in as you did the amber, now and then pouring in a little oil of turpentine; and when it is done, ſtrain it as before directed.

This is proper varniſh over gold; and the things done with it muſt be ſet in a declining oven, three or four days ſucceſſively, and then it will reſiſt even the fire itſelf.

4. To make a varniſh for braſs, that will cauſe it to look like gold. Take two quarts of ſpirit of wine, and put it into a retort-glaſs; then add to it an ounce of gamboge, two ounces of lacca, and two ounces of maſtic; ſet this in a ſand-heat for ſix days, or elſe near a fire, or you may put the body of the bolt-head frequently into warm water, and ſhake it two or three times a day; then ſet over a pan of warm ſaw-duſt. But before this varniſh is laid over the metal, let it be well cleaned.

This is a good varniſh to mix with any colours that incline to red, and the amber-varniſh for mixing with thoſe that are pale.

5. To make a varniſh for gold, or metals made in imitation of gold. Take colophony, and, having melted it, put in two ounces of amber finely powdered, and ſome ſpirit of turpentine, and, as the amber thickens, keep it well ſtirring; then put in an ounce of gum elemi, well pulverized, and more ſpirit of turpentine; conſtantly ſtirring the liquor till all is well mixed and incorporated; but take care, however, to uſe as little turpentine as you can, becauſe the thicker the varniſh is made, the harder it will be. Let this be done over a ſand heat, in an open glaſs; then ſtrain it, as is directed for the preceding varniſh.

This varniſh is to be uſed alone, firſt warming the veſſels made of paper-paſte; and lay it on with a painting-bruſh before the fire, but not too near, leſt the fire raiſe it into bliſters. After this has been done, harden it three ſeveral times in ovens; firſt with a ſlack heat, the next with a warmer, and the third with a very hot one; and the veſſels will look like poliſhed gold.

And as for ſuch veſſels, &c. as ſhall be made with ſaw-duſt and gums, the varniſh may be made of the ſame ingredients as above mentioned, except the gum elemi; and this will dry in the ſun, or in a gentle warmth.

6. To make a varniſh for any thing covered with leaf ſilver. Firſt paint the thing over with ſize, and ground chalk or whiting; let them ſtand till they are thoroughly dry, and then do them over with very good gold-ſize, of a bright colour (for there is much difference in the colour of it; ſome being yellow, and others almoſt white; the firſt is moſt proper for gold, and the laſt for ſilver.) When this ſize is ſo dry as that it will juſt ſtick a little to the touch, lay on the leaf-ſilver, and cloſe it well to the ſize.

7. To make a varniſh for ſilver. Melt, in a well-

well-glazed pipkin, ſome fine turpentine, and put in three ounces of white amber, finely powdered (more or leſs, according to the quantity your work will require) put it in by little and little, keeping it continually ſtirring, adding by degrees ſome ſpirit of turpentine, till all the amber is diſſolved; and then add to it an ounce of ſarcocolla well beaten, and an ounce of gum elemi well levigated, adding now and then a little ſpirit of turpentine, till all is diſſolved: do this over a gentle fire, and keep it conſtantly ſtirring.

This varniſh will be as white and ſtrong as the former; and is to be uſed warm, and hardened by degrees in an oven, as varniſhed gold, whereby it will look like poliſhed ſilver.

Laying on of VARNISHES. 1. If you varniſh wood, let your wood be very ſmooth, cloſe grained, free from greaſe, and rubbed with ruſhes.

2. Lay on your colours as ſmooth as poſſible; and, if the varniſh has any bliſters in it, take them off by a poliſh with ruſhes.

3. While you are varniſhing, keep your work warm, but not too hot.

4. In laying on your varniſh, begin in the middle, and ſtroke the bruſh to the outſide; then to another extreme part, and ſo on till all be covered; for if you begin at the edges, the bruſh will leave blots there, and make the work unequal.

5. In fine works, uſe the fineſt tripoli in poliſhing: do not poliſh it at one time only, but, after the firſt time, let it dry for two or three days, and poliſh it again for the laſt time.

6. In the firſt poliſhing, you muſt uſe a good deal of tripoli, but in the next, a very little will ſerve: when you have done, waſh off your your tripoli with a ſponge and water; dry the varniſh with a dry linen rag; and clear the work, if a white ground, with oil and whiting; or, if black, with oil and lamp-black.

VARNISH, alſo ſignifies a ſort of ſhining coat, wherewith potter's ware, delft ware, china ware, &c. are covered, which gives them a ſmoothneſs and luſtre.

Melted lead is generally uſed for the firſt, and ſmalt for the ſecond. See GLAZING.

VARNISH, among medalliſts, ſignifies the colours antique medals have acquired in the earth.

The beauty which nature alone is able to give to medals, and art has never yet attained to counterfeit, enhances the value of them; that is, the colour which certain ſoils, in which they have a long time lain, tinges the metals withal; ſome of which are blue, almoſt as beautiful as the turquoiſe; others with an inimitable vermilion colour; others with a certain ſhining poliſhed brown, vaſtly finer than Braſil figures.

The moſt uſual varniſh is a beautiful green, which hangs to the fineſt ſtrokes without effacing them, more accurately than the fineſt enamel does on metals.

No metal but braſs is ſuſceptible of this; for the green ruſt that gathers on ſilver always ſpoils it, and it muſt be got off with vinegar, or lemon-juice.

Falſifiers of medals have a falſe or modern varniſh, which they uſe on their counterfeits, to give them the appearance, or air, of being antique. But this may be diſcovered by its ſoftneſs, it being ſofter than the natural varniſh, which is as hard as the metal itſelf.

Some depoſite their ſpurious metals in the earth for a conſiderable time, by which means they contract a ſort of varniſh, which may impoſe upon the leſs knowing; others uſe ſal armoniac, and others burnt paper.

VARRONIA, in botany, a genus of plants, whoſe flower is monopetalous, tubuloſe, cylindric, and divided at the limb into five patent ſegments, having five ſubulated filaments terminated with incumbent oblong antheræ: the fruit is an egg-ſhaped drupe, looſely included in the cup, containing a roundiſh quadrilocular nut.

VAS, a veſſel, either for mechanical, chemical, culinary, or any other uſes.

In anatomy, all the parts which convey a fluid are called veſſels, as the veins, arteries, and lymphatics.

VASCULAR, in anatomy, ſomething conſiſting of divers veſſels; as arteries, veins, nerves, &c.

VASCULIFEROUS PLANTS, are ſuch whoſe ſeeds are contained in veſſels, which are ſometimes divided into cells; theſe have always a monopetalous flower, either uniform or difform.

VASE, a term frequently uſed for ancient veſſels dug from under ground, or otherwiſe found, and preſerved in the cabinets of the curious.

VASE, in architecture, is alſo an appellation given to thoſe ornaments placed on corniches, ſockles, or pedeſtals, repreſenting the veſſels of the ancients, particularly thoſe uſed in ſacrifice; as incenſe-pots, flower-pots, &c. They ſerve to crown or finiſh facades, or frontiſpieces; and hence called acroteria.

The term vaſe, however, is more particularly uſed, in architecture, to ſignify the body of the Corinthian and Compoſite capital; otherwiſe called the tambour or drum, and ſometimes the campana or bell.

VASE, is alſo ſometimes uſed, among floriſts, for what is more uſually called the calyx, or cup. See the article CALYX.

VASSAL, in old law-books, denotes a tenant that held lands in fee of his lord, to whom he vowed fidelity and ſervice.

VASTO, in law, a writ that lies for the heir, or him in reverſion, or remainder, againſt the tenant for term of life or years, for making waſte.

VASTUS, in anatomy, the name of two of the extenſor muſcles of the legs; the one, called vaſtus internus, ariſes from the whole internal ſide of the femur; and the other, called vaſtus externus, takes its riſe from the whole external ſide of the femur; and both together, with the cruralis and rectus, form a very robuſt and ſtrong tendon juſt above the knee, to which the patella adheres behind, and which is inſerted below the knee at a tubercle of the tibia. See MUSCLE.

VAT, or FAT, a veſſel for holding wine, ale, beer, cyder, &c. in the time of their preparation.

VATERIA, in botany, a genus of plants, whoſe flower conſiſts of five ovate petals, with a great number of ſtamina, which are ſhorter than the petals; the fruit is a coriaceous, turbinated, unilocular capſule, containing one egg-ſhaped ſeed.

VAULT, *Fornix*, in architecture, an arched roof, ſo contrived that the ſtones which form it ſuſtain each other. See ARCH.

Vaults are, on many occaſions, to be preferred to ſoffits or flat ceilings, as they give a greater height and elevation, and are beſides more firm and durable. See the article CEILING.

Salmaſius obſerves, that the ancients had only three kinds of vaults. The firſt was the fornix, made cradle-wiſe; the ſecond a teſtudo, i. e. tortoiſe-wiſe, which the French call cul de four, or oven-wiſe, and the third concha, or trumpet-wiſe.

But the moderns have ſubdivided theſe three ſorts into many more, to which they have given different names, according to their figures and uſes; ſome of them are circular, and others elliptical.

Again, the ſweeps of ſome are larger, others leſs, portions of a ſphere. All ſuch as are above hemiſpheres, are called high, or ſurmounted, vaults; and all that are leſs than hemiſpheres, are called low, or ſurbaſed, vaults, or teſtudines.

In ſome vaults the height is greater than the diameter; in others it is leſs: others, again, are quite flat, and only made with haunſes; others like ovens, or in the form of a cul de four, &c. and others growing wider as they lengthen, like a trumpet.

There are alſo gothic vaults, with ogives, &c. See OGIVE, &c.

Of vaults ſome again are ſingle, others double, croſs, diagonal, horizontal, aſcending, deſcending, angular, oblique, pendent, &c.

Maſter VAULTS are thoſe that cover the principal parts of buildings, in contradiſtinction to the upper or ſubordinate vaults, which only cover ſome little part, as a paſſage or gate, &c.

Double VAULT is one that is built over another, to make the outer decoration range with the inner; or, to make the beauty and decoration of the inſide conſiſtent with that of the outſide, leaves a ſpace between the concavity of the one and the convexity of the other. Inſtances of which we have in the dome of St. Peter's at Rome, St. Paul's at London, and in that of the invalids at Paris.

VAULTS *with Compartments* are ſuch whoſe ſweep, or inner face, is enriched with pannels of ſculpture, ſeparated with platbands. Theſe compartments, which are of different figures, according to the vaults, and uſually gilt on a white ground, are made with ſtone or brick-walls, as in the church of St. Peter at Rome, or with plaiſter on timber-vaults.

Theory of VAULTS. A ſemi-circular arch or vault, ſtanding on two piedroits, or impoſts, and all the ſtones that compoſe them, being cut, and placed in ſuch manner as that their joints or beds, being prolonged, do all meet in the center of the vault; it is evident that all the ſtones muſt be in the form of wedges; i. e. muſt be wider and bigger at top: by virtue of which they ſuſtain each other, and mutually oppoſe the effort of their weight, which determines them to fall.

The ſtone in the middle of the vaults, which ſtands perpendicular to the horizon, and is called the key of the vault, is ſuſtained on each ſide by two contiguous ſtones, juſt as by two inclined planes; and, conſequently, the effort it makes to fall is not equal to its weight.

But ſtill that effort is the greater, as the inclined planes are leſs inclined; ſo that if they were infinitely little inclined, i. e. if they were perpendicular to the horizon as well as the key, it would tend to fall with its whole weight, and would actually fall but for the mortar.

The ſecond ſtone, which is on the right or left of the key-ſtone, is ſuſtained by a third, which, by virtue of the figure of the vault, is neceſſarily more inclined to the ſecond than the ſecond is to the firſt; and conſequently the ſecond, in the effort it makes to fall, employs a leſs part of its weight than the firſt. For the ſame reaſon, the ſtones from the key-ſtone employ ſtill a leſs and leſs part of their weight to the laſt, which, reſting on a horizontal plane, employs no part of its weight; or, which is the ſame thing, makes no effort at all, as being entirely ſupported by the impoſt.

Now, in vaults, a great point to be aimed at is, that all the vouſſoirs, or key-ſtones, make an equal effort towards falling. To effect this, it is viſible, that as each (reckoning from the key to the impoſt) employs ſtill a leſs and leſs part of its whole weight; the firſt, for inſtance, only employing one half; the ſecond one third; the third, one fourth, &c. There is no other way of making thoſe different parts equal, but by a proportionable augmentation of the whole; i. e. the ſecond ſtone muſt be heavier than the firſt, the third than the ſecond, &c. to the laſt; which ſhould be infinitely heavier.

M. de la Hire demonſtrates what that proportion is, in which the weights of the ſtones of a ſemi-cir-

circular arch must be increaſed to be in æquilibrio, or to tend with equal forces to fall, which is the firmeſt diſpoſition a vault can have.

The architects before him had no certain rule to conduct themſelves by, but did all at random. Reckoning the degrees of the quadrant of a circle, from the key-ſtone to the impoſt, the extremity of each ſtone will take up ſo much the greater arch as it is farther from the key.

M. de la Hire's rule is to augment the weight of each ſtone above that of the key-ſtone, as much as the tangent of the arch of the ſtone exceeds the tangent of the arch of half the key. Now the tangent of the laſt ſtone of neceſſity becomes infinite, and of conſequence its weight ſhould be ſo too; but, as infinity has no place in practice, the rule amounts to this, that the laſt ſtones be loaded as much as poſſible, that they may the better reſiſt the effort which the vault makes to ſeparate them; which is called the ſhoot or drift of the vault.

Mr. Parent has ſince determined the curve, or figure, which the extrados, or outſide of a vault, whoſe intrados, or inſide, is ſpherical, muſt have, that all the ſtones may be in equilibrio.

Key of a VAULT, is a ſtone or brick in the middle of the vault, in form of a truncated cone, ſerving to bind or faſten all the reſt. See the article KEY.

Reins, or fillings up of a VAULT, are the ſides which ſuſtain it.

Pendentive of a VAULT, is the part ſuſpended between the arches or Ogives. See the article PENDENTIVE.

Impoſt of a VAULT, is the ſtone whereon the firſt vouſſoir, or arch-ſtone of the vault, is laid. See impoſt.

UBIQUITARIANS, in church-hiſtory, a ſect of heretics who ſprung up in Germany about the year 1590, and maintained that the body of Jeſus Chriſt is *ubique*, everywhere, or in every place, at the ſame time. However, they were not quite agreed among themſelves; ſome holding, that the body of Jeſus Chriſt, even during his mortal life, was every where; and others dating the ubiquity of his body from the time of his aſcenſion only.

UBIQUITY, omnipreſence; an attribute of the Deity, whereby he is always intimately preſent in all things; gives the eſſe to all things; knows, preſerves, and does all in all things. See GOD.

For, ſince God cannot be ſaid to exiſt in all places, as placed therein (becauſe then he would need ſomething to his exiſtence, viz. place; and would have extenſion, parts, &c.) he muſt be conceived to be everywhere, or in all things, as a firſt, univerſal, efficient cauſe, in all his effects.

He is preſent therefore to all his creatures, as a pure act or an exerciſe of an active virtue, which knows, preſerves, governs, &c. every thing. Nor are even finite minds preſent, otherwiſe than by operation.

UDDER, *Uber*, in comparative anatomy, that part in brutes wherein the milk is prepared, anſwering to the mammæ, or breaſts, in women.

VECTIS, the lever, one of the mechanic powers. See the article LEVER.

VECTOR, in aſtronomy, a line ſuppoſed to be drawn from any planet moving round a center, or the focus of an ellipſis, to that center or focus.

This, by ſome writers of the new aſtronomy, is called vector, or radius vector, becauſe it is that line by which the planet ſeems to be carried round its center, and with which it deſcribes areas proportional to the times.

VEDETTE, in the military art, a ſentinel on horſeback detached from the main body of the army, to diſcover and give notice of the enemies deſigns.

VEER, a ſea-term variouſly uſed. Thus veering out a rope, denotes the letting it go by hand, or letting it run out of itſelf. It is not uſed for letting out any running rope except the ſheet.

VEER is alſo uſed in references to the wind; for, when it changes often, they ſay it veers about.

VEGETABLE, *Vegetabile*, in phyſiology, a term applied to all plants, conſidered as capable of growth, i. e. all natural bodies which have parts organically formed for generation and accretion, but not ſenſation.

Vegetables, according to the analyſes made of them by chemiſtry, are diſtinguiſhable into two grand tribes, the acid and the alkaline; the firſt affording a volatile acid, and the ſecond a volatile alkali, upon a dry diſtillation: thus guaiacum, cedar, box, cinnamon, cloves, ſorrel, mint, balm, &c. afford an acid; but garlic, onions, horſe-radiſh, ſcurvy-graſs, muſtard, &c. afford an alkali, which, rectified, is hardly diſtinguiſhable from that of animal ſubſtances, ſo as nearly to reſemble the ſpirit and ſalt of hartſhorn.

VEGETATION, in phyſiology, the act whereby plants receive their nouriſhment and growths; of which, three principal functions are underſtood, viz. nutrition, increaſe, and generation.

From Scripture we learn, that the earth has been endued, from the beginning, with a certain ſeminal virtue to produce plants; which virtue, proceeding from God, was not confined to the firſt production of things, but extends likewiſe to all future conſequences of times; and this faculty which the earth has of producing plants, is from this commandment of the Almighty: "Let the earth bring forth graſs, the herb yielding ſeed, and the fruit-tree yielding fruit after his kind, whoſe ſeed is in itſelf upon the earth; and it was ſo." Gen. i. 11.

Philoſophers aſk, what can be that virtue the earth is ſaid to be endued with, if it be only an inherent quality whereby it produces, naturally, all ſorts

ſorts of plants, without the concurrence of ſeed? or if a ſeminal virtue (or ſeed) muſt be adminiſtered to it? Some follow the firſt opinion, for this reaſon, that earth dug up from a great depth and put into pots, after a ſet time or ſeaſon, produces ſeveral ſorts of plants of itſelf without ſeed; but though this opinion be approved of by many, it has not, however, the leaſt appearance of probability on its ſide; for who (conſidering with attention the progreſs of nature, ſees the marvellous mechaniſm of the organs of plants, the whole texture of their internal as well as external parts) could be perſuaded to attribute it to a heavy and indigeſted maſs of clay or earth: therefore, it is more rational to ſay, that plants have their origin from ſeeds, which being taken from the firſt plants, have propagated their ſpecies by the Creator's will, as far as our times, and will continue to do ſo (particularly where they are natives) to the end of the world.

The ſun, rain, the exhalations of the earth, and the reſt of the exterior cauſes, are capable to excite a certain motion or fermentation in the boſom of the earth; but unleſs there be a ſeed which contains already the conformation of the plant, whoſe parts are unfolded by that fermentation, never ſuch fermentation or motion can give origin to the plant; therefore, we have great reaſon to think, that all plants have their origin from ſeeds, actually or potentially, ſince the firſt rudiments of a plant can be diſcovered no where elſe, nor by the naked eye, nor even by the help of a microſcope; ſo that the ſeed contains not only the coarſer matter of the plant, with its organical parts, which have the ratio of a body, but likewiſe a certain ſpirit, that is, an active and vegetative ſubſtance, which may be called the ſoul of the plant. Although, in ſome manner, it may be ſaid to ſleep in the grain or ſeed, yet when excited to motion by the heat of the ſun, the warmth of the earth, and with rain impregnated with particles of volatile ſalts, it then unfolds its parts and puſhes the embryo plant forward.

A ſprig or cutting muſt contain in it this ſeminal property, for being ſet at a proper ſeaſon, it produces a tree with all its generative parts; which it would not do were it not endued with ſome ſeminal virtues.

This generative or ſeminal faculty, is a power of the vegetative ſoul of a plant, by which it lives and produces its likeneſs for the preſervation of the ſpecies: but this faculty is not diſcernable from the ſeed itſelf, nor from the ſpirit contained therein, for as the ſeed is ſaid to be a part of ſome ſubſtance, deſigned for the production of another ſubſtance of the ſame ſpecies, it is not abſolutely neceſſary to diſtinguiſh that prolific virtue from the ſeed itſelf, nor from the ſpirit contained in it; for after the ſeed is ſown and ſoftened by the warmth and humidity of the earth, its germ (wherein the plant is contained, as in an epitome) is unfolded by a gentle fermentation, and ariſes into a plant.

That the heat of the ſun and the temperate warmth and humidity of the earth, are the firſt principles of vegetation, appears from the ſterility or fertility of the ſoil in thoſe climates where theſe two principal agents act, or do not act, in concert; ſince, in the moſt northern countries, where the humidity of the ſoil is exceſſive, and its natural warmth is too much concentered, the fermentation of the ſeed being made with too much precipitation, and without that gradation neceſſary for the eaſy and moſt perfect expanſion of the different parts of the plant, thereby they are fruſtrated of that ſtrength they ſhould have before they come out of the matrix it has been formed in to reſiſt the injuries of the air and the inconſtancies of the ſeaſons, it periſhes almoſt as ſoon as it appears on the ſurface of the earth; for although the earth has in ſome meaſure, though very imperfectly, acted its part (as it cannot alone, and without the aſſiſtance of the ſun, carry the plant to its laſt perfection) that tender parent of nature, by the obliquity of its ſituation, being reduced to the incapacity of darting its rays as favourably and abundantly in thoſe climates as he does in others more happily ſituated, cannot either help the mother earth in her pregnancy, nor rectify what ſhe has left imperfect in her productions, which therefore die almoſt as ſoon as nature itſelf is appriſed of their exiſtence.

Likewiſe in thoſe other climates ſituated quite different from theſe where the ſun, by being too profuſe of its influences, penetrates the inmoſt parts of the womb of the earth, and by its too violent and too often repeated acts, and exalting its ſalts, and evaporating its radical humidity, cauſes an exceſſive dilatation of its pores, a diſunion, and but too often an intire laceration of its generative parts, ſo as to render them quite ſteril or barren, and therefore incapable to contribute to that fermentation abſolutely neceſſary for the production of plants.

On the contrary, in thoſe happy climates where the parts of the earth are ſo ſituated in reſpect to the ſun as to be under his moſt favourable aſpect, and expoſed to none but his moſt benign influences, it almoſt always continues in its natural flouriſhing ſtate, being ſeldom viſited by the moſt powerful and penetrating beams of the ſun but at thoſe regular and periodical times appointed by nature for its pregnancy, when they are neceſſary to excite her fœcundity, or to nouriſh and cheriſh her productions when once brought forth.

Suppoſe our ſeed to have been ſown in this laſt ſoil and ſituation, the firſt things which preſent themſelves to the imagination are the ſun and earth concerting together, the one by its heat, and the other by her moiſture, how to rid the embryo of that hard tough ſubſtance it is enwrapped in, and which is

is the greateſt obſtacle to the burſting forth of its parts; therefore the earth, which is the firſt agent in this caſe, and which is to do the office of incubation, makes uſe firſt of its natural moiſture to ſoften the outer rind or huſk, by having it percolated through the pores or pipes of the ſaid huſk, whereby they are ſo opened and dilated as to facilitate the introduction of the different ſalts appointed to operate on the whole ſubſtance of the ſeed, by unfolding the different parts it contains, and diſpoſing them ſeverally towards aſſuming their reſpective forms.

It cannot be imagined that the earth acts alone in this firſt operation, that it could direct itſelf to action without the concurrence of the ſun, which on this occaſion excites, by a gentle warmth, the different ſalts the moiſture of the earth is impregnated with, that they may be capable to conquer the ſtubbornneſs of the huſk, by forcing themſelves into its almoſt imperceptible pores, conquering all the obſtacles, and raiſing all the obſtructions which the ſeveral ſubſtances may meet with; by this means a free paſſage being opened for ſuch a quantity of the moiſture as is neceſſary to make a due ſeparation of the huſk from the more eſſential part of the ſeed, the ſalts employed in that operation being volatilized or already fixed on that eſſential part, leave the huſk filled with nothing elſe but the lympha, which groweth turged, and being deprived of the nouriſhment it received when united to the ſubſtance of the ſeed, begins to tend towards its deſtruction.

The following procedure in the vegetation of plants is exemplified by Malpighi in a grain of wheat; the firſt day the grain is ſown it grows a little turgid, and the ſecundine, or huſk, gapes a little in ſeveral places, and the body of the plant being continued by the umbilical veſſel to a conglobated leaf (which is called the pulp or fleſh of the ſeed, and is what conſtitutes the flour) ſwells, by which means not only the gem or ſprout (which is to be the future ſtem) opens and increaſes, but the roots begin to bunch out, whence the placenta, or ſeed-leaf, becoming looſe, gapes. The ſecond day the ſecundine or huſk being broken through, the ſtem or top of the future ſtraw appears on the outſide thereof, and grows upwards by degrees; in the mean time, the ſeed leaf guarding the roots becomes turgid with its veſiculæ, and puts forth a white down, and the leaf being pulled away, you may ſee the roots of the plant bare, the future bud, leaves, and the reſt of the ſtalk lying ſtill hid. Between the roots and aſcending ſtem, the trunk of the plant is knit by the navel-knot to the flower-leaf, which is very moiſt, though it ſtill retains its white colour and its natural taſte. The third day the pulp of the conglobated or round leaf becomes turged with the juice it has received from the earth fermenting with its own; thus the plant increaſes in bigneſs, and in its bud or ſtem becomes taller, and from whitiſh becomes greeniſh, the lateral roots alſo break forth greeniſh and pyramidal from the gaping ſheaf which adheres cloſely to the plant, and the lower roots grow longer and hairy, with many fibres growing out of the ſame; indeed there are hairy fibres hanging on all the roots, except on the tops, and theſe fibres are ſeen to wind about the ſaline particles of the ſoil, little lumps of earth, &c. like ivy, whence they grow curled about the latent roots, and then break out into two other little ones. The fourth day the ſtem mounting upwards, makes a right angle with the ſeminal leaf, the laſt roots put forth more, and the other three growing larger are cloathed with more hairs, which ſtraitly embrace the lumps of earth, and where they meet with any vacuity, unite into a kind of net-work; the conglobate or flower-leaf is now ſofter, and when bruiſed yields a white ſweetiſh juice, like barley cream; by ſtripping it off, the root and ſtem of the plant are plainly ſeen, with the intermediate navel-knot, whoſe outer part is ſolid like a bark, and in the inner more ſoft and medullary. The fifth day the ſtalk ſtill riſing puts forth a permanent or ſtable leaf, which is green and folded, the roots grow longer, and there appears a new tumour of a future root, the outer ſheath is looſened, and the ſeed-leaf begins to fade. The ſixth day the ſtable leaf being looſened, the plant mounts upwards, the ſheaf ſtill cleaving round it like a bark; the ſeed-leaf is now ſeen ſinuous or wrinkled and faded, and this being freed or cut from the ſecundine, the fleſh, or pericarpium is found of a different texture, the outer part, whereby the outſide of the ſeed or grain is heaped up, being more ſolid, but the inſide viſcular and full of humour, eſpecially that part next the navel-knot. All the leaves being pulled off, the roots torn, and the flower-leaf removed, the trunk appears, wherein, not far from the roots, the navel-knot bunches out, which is ſolid and hard to cut; above there is a mark of the ſheath-leaf, which was pulled, and underneath, as in an armpit, the gem is often hid; the hind part of the plant ſhews the breaking forth of the roots likewiſe, with the faded placenta, &c. After the eleventh day, the ſeed-leaf as yet ſticking to the plant, is crumpled and almoſt corrupted; within it is hollow, and about the ſecundine the mucus and white ſubſtance of the ſeed being continued to the navel-knot, forms a cavity, all the roots becoming longer, put forth new branches out of their ſides, the ſecond leaf withers, and its viſicles are emptied; the internodes, or ſpaces between the knots, grow longer; new gems appear, and the middle root grows ſeveral inches longer. After a month, the roots and ſtalk being grown much longer, new buds break out at the firſt knot, and little tumours bunch out, which at length break out into roots.

Thus, according to Malpighi, in this ſhort ſpace

of time the plant passes through all these various changes and mutations, which, though his observations may be real as here represented, yet it does not happen with such celerity in all sorts of plants, though in some kinds all these variations may come to pass in a shorter time.

The plant carried thus far, it still wants food for the future preservation of its vegetative life, which being deprived of such nutriment, it cannot exist; of which naturalists are so sensible, that their common opinion is, that water is the great vegetable food which they endeavour to confirm by repeated experiments, especially by that made on a sprig of baum, mint, &c. which being set in a phial of pure water, without any mixture of earth, grow and put forth roots, leaves, and branches; without considering, that those sorts of plants being of a short duration, the juices which they have received from their mother earth in their first formation circulating through their vessels, being continually recruited by the salts the water they are set in is impregnated with, together with those they receive continually from the ambient atmosphere, are more than sufficient for the support of their short life in the water, which subsists no longer than that the water continues to supply them with salts, of which when once exhausted, it grows viscous, obstructs the pores of the vessels, and hinders thereby the admission of salts even from the atmosphere, imbecillitate by degrees the functions of the vegetative soul, which being forced for some time to feed on its own substance, becomes at last enervated and impotent, whereby the plant withers and dies for want of food, unless the water is changed before it comes to the last period, which appears at its growing offensive to the smell; even that precaution becomes useless, at least for the greatest part.

Those salts the water is impregnated with, being heterogeneous to those which enter into the composition of the juices, which circulate through the vessels of the plant, have soon, by disordering the whole frame of that mechanism, procured the extinction of the plant.

The great quantity of oleaginous particles those sorts of plants are composed of, which keep their pores extremely dilated for the admission of salts and other nutritive particles, contribute much towards the production of this phænomenon; but in plants of a closer texture, whose pores are so exiguous as not to be forced, but by the impetuosity of salts exalted and volatilized, best by the warmth of the earth and the heat of the sun, this experiment is of no effect; therefore, water cannot be simply considered as the great vegetable food, although it has a very considerable share in the nutriment of plants: but were it water alone, to which vegetables owe their increase, there would be no need of manures nor changing the kinds. The rain falls in all places upon the most barren land, as well as on the most fertile; nor could there be any reason why the same field should yield a large crop of wheat one year, and not the next, since rain showers down nearly alike on the earth. See LEAF, PLANT, &c.

VEGETATIVE SOUL, among philosophers, denotes that principle in plants, by virtue of which they vegetate, or receive nourishment, and grow. See the preceding article.

VEHICLE, *Vehiculum*, in general, denotes any thing that carries or bears another along; but is more particularly used, in pharmacy, for any liquid serving to dilute some medicine, in order that it may be administered more commodiously to the patient.

VEIL, *Velum*, a piece of stuff, serving to cover or hide any thing.

A veil, or crape, is worn on the head by nuns, as a badge of their profession: the novices wear white veils; but those who have made the vows, black ones. See NUN.

VEIN, *Vena*, in anatomy, is a vessel which carries the blood from the several parts of the body to the heart.

The veins are composed principally of a membranaceous, a vasculous, and a musculous tunic: but these are vastly thinner than in the arteries. See ARTERY.

The veins are only a continuation of the extreme capillary arteries, reflected back again towards the heart, and uniting their channels as they approach it, till at last they all form three large and primary veins, viz. the cava, which brings the blood back from all parts above and below the heart; the vena portæ, which brings the blood from the liver; and the pulmonary vein. See CAVA, &c.

The best method of tracing the general course of the veins, is to begin with the main trunks, or primary veins, and end with their ramifications and capillary extremities, according to their several divisions and subdivisions.

VEIN, among miners, is that space which is bounded with woughs, and contains ore, spar, cank, clay, chirt, croil, brownhen, pitcher-chirt, cur, which the philosophers call the mother of metals, and sometimes, soil of all colours. When it bears ore, it is called a quick vein; when no ore, a dead vein. See TRACING.

VEJOURS, *Visores*, in law, are those sent by the court to take a view of any place in question, for the better decision of the right.

VELAMENTUM BOMBYCINUM, a name which some anatomists give to the velvet membrane, or inner skin of the intestines.

VELEZIA, in botany, a genus of plants, whose flower consists of five very short petals, bidentated at their margins with slender ungues the length of the cup: the stamina are six capillary filaments, topped with

with heart-ſhaped antheræ: the fruit is a cloſe, cylindric, unilocular capſule, containing many ſeeds placed in a ſingle ſeries.

VELLA, Spaniſh-creſs, in botany, a genus of plants, whoſe flower is tetrapetalous and cruciform; the fruit is a globoſe pod, divided by an intermediate partition into two cells, containing a few roundiſh ſeeds.

VELLICATION, among phyſicians, the act of twitching. The word is more particularly applied to a ſort of ſudden convulſions that happen to the fibres of the muſcles.

VELOCITY, ſwiftneſs, or that affection of motion whereby a moving body is diſpoſed to run over a certain ſpace in a certain time. See MOTION.

For the velocity of falling bodies, ſee the article ACCELERATION.

In the doctrine of fluxions it is uſual to conſider the velocity with which magnitudes flow, or are generated. Thus, the velocity with which a line flows, is the ſame as that of the point, which is ſuppoſed to deſcribe or generate the line. The velocity with which a ſurface flows, is the ſame as the velocity of a given right-line, that, by moving parallel to itſelf, is ſuppoſed to generate a rectangle, always equal to the ſurface. The velocity with which a ſolid flows, may be meaſured by the velocity of a given plain ſurface that, by moving parallel to itſelf, is ſuppoſed to generate an erect priſm, or cylinder, always equal to the ſolid. The velocity with which an angle flows, is meaſured by the velocity of a point, ſuppoſed to deſcribe the arc of a given circle, which ſubtends the angle, and meaſures it. All theſe velocities are meaſured at any term of the time of the motion, by the ſpaces which would be deſcribed in a given time, by theſe points, lines, or ſurfaces, with their motions continued uniformly from that term.

The velocity with which a quantity flows, at any term of the time, while it is ſuppoſed to be generated, is called its fluxion.

VELOM, a kind of parchment, finer, evener, and whiter than the common ſort. See the article PARCHMENT.

VELVET, a rich kind of ſtuff, all ſilk, covered on the outſide with a cloſe, ſhort, fine, ſoft ſhag, the otherſide being a very ſtrong cloſe tiſſue.

The nap or ſhag, called alſo the velveting, of this ſtuff, is formed of part of the threads of the warp, which the workman puts on a long narrow-channeled ruler or needle, which he afterwards cuts, by drawing a ſharp ſteel tool along the channel of the needle to the ends of the warp. The principal and beſt manufactories of velvet are in France and Italy, particularly in Venice, Milan, Florence, Genoa, and Lucca: there are others in Holland, ſet up by the French refugees; whereof that at Harlem is the moſt conſiderable: but they all come ſhort of the beauty of thoſe in France, and, accordingly, are ſold for ten or fifteen *per cent.* leſs. There are even ſome brought from China, but they are the worſt of all.

There are velvets of various kinds; as plain, that is, uniform and ſmooth, without either figures or ſtripes.

Figured velvet, that is, adorned and worked with divers figures, though the ground be the ſame with the figures; that is, the whole ſurface velveted.

Ramage or branched velvet, repreſenting long ſtalks, branches, &c. on a ſattin ground, which is ſometimes of the ſame colour with the velvet, but more uſually of a different one.

Sometimes, inſtead of ſattin, they make the ground of gold and ſilver; whence the denominations of velvets with gold ground, &c.

Shorn velvet, is that wherein the threads, that make the velveting, have been ranged in the channeled ruler, but not cut there. Striped velvet, is that wherein there are ſtripes of divers colours running along the warp, whether theſe ſtripes be partly velvet, and partly ſattin, or all velveted. Cut velvet, is that whereon the ground is a kind of taffety, or groſs de tours, and the figures velvet.

Velvets are likewiſe diſtinguiſhed, with regard to their different degrees of ſtrength and goodneſs, into velvets of four threads, three threads, two threads, and a thread and a half: the firſt are thoſe where there are eight threads of ſhag, or velveting, to each tooth of the reed; and the ſecond have only ſix, and the reſt four.

In general, all velvets, both worked and cut, ſhorn and flowered, are to have their warp and ſhag of organiſm, ſpun and twiſted, or thrown in the mill; and their woof of ſilk well boiled, &c. They are all of the ſame breadth.

VENAL, or VENOUS, among anatomiſts, &c. ſomething that bears a relation to the veins. See the article VEIN.

This word is alſo uſed for ſomething bought with money, or procured by bribes.

VENEERING, VANEERING, or FINEERING, a kind of marquetry, or inlaying, whereby ſeveral thin ſlices or leaves of fine woods, of different kinds, are applied and faſtened on a ground of ſome common wood. See MARQUETRY.

There are two kinds of inlaying; the one, which is the moſt common and more ordinary, goes no farther than the making of compartments of different woods; the other requires much more art, in repreſenting flowers, birds, and the like figures.

The firſt kind is properly called veneering; the latter is more properly called marquetry.

The wood uſed in veneering is firſt ſawed out into ſlices or leaves about a line in thickneſs; i. e. the twelfth part of an inch. In order to ſaw them, the blocks or planks are placed upright, in a kind of ſawing preſs. See SAWING MILL.

Theſe ſlices are afterwards cut into narrow ſlips, and

and fashioned divers ways, according to the design proposed; then the joints having been exactly and nicely adjusted, and the pieces brought down to their proper thickness, with several planes for the purpose, they are glued down on a ground or block, with good strong English glue.

The pieces being thus jointed and glued, the work, if small, is put in a press; if large, 'tis laid on a bench covered with a board, and pressed down with poles or pieces of wood, one end of which reaches to the ceiling of the room, and the other bears on the board.

When the glue is thoroughly dry, it is taken out of the press and finished; first with little planes, then with divers scrapers, some of which resemble rasps, which take off the dents, &c. left by the planes.

After it has been sufficiently scraped, they polish it with the skin of a sea-dog, wax and a brush, or polisher of shave grass; which is the last operation.

VENEREAL, something belonging to venery; as the lues venerea, french disease, or pox.

VENERIS ŒSTRUM, the stimulus or incentive of venery, is an appellation given by some anatomists to the clitoris.

VENERIS ŒSTRUM is also used by others for the transport of love, or the utmost extacy of desire, or enjoyment, in coition.

VENERY, is used for the act of copulation, or coition of the two sexes.

VENERY also denotes the act or exercise of hunting wild beasts, which are also called beasts of venery, and beasts of the forest. See the article GAME.

VENESECTION, or PHLEBOTOMY, in surgery. See the article PHLEBOTOMY.

VENETA BOLUS, the Venetian bole, a fine red earth used in painting, and called in the colour-shops Venetian red. It is improperly denominated a bole, being a genuine species of red ochre. It is of a fine bright, and not very deep red, approaching, in some degree, to the colour of minium, or read-lead, and is moderately heavy, and of an even and smooth texture, yet very friable, and of a dusty surface: it adheres firmly to the tongue, is very smooth, and soft to the touch, easily crumbles to pieces between the fingers, and very much stains the skin in handling. It has a slight astringent taste, and makes no fermentation with acids. It is dug in Carinthia, and sent from Venice to all parts of the world, being an excellent colour, and very cheap; our colour-men however find many ways of adulterating it.

VENIAL, in the Romish theology, a term applied to slight sins, and such as easily obtain pardon. In confessing to the priests, people are not obliged to accuse themselves of all their venial sins. The thing that gives the greatest embarras to the Roman casuists, is to distinguish between venial and mortal sins. The reformed reject this distinction of venial and mortal sins, and maintain, that all sins, how grievous soever, are venial, and all sins, how slight soever, are mortal. And the reason they urge is, that all sins, though of their own nature mortal, yet become venial or pardonable, by virtue of our Saviour's passion, to all such as fulfil the conditions on which it is offered in the gospel.

VENT, VENT-HOLE, or SPIRACLE, a little aperture left in the tubes or pipes of fountains, to facilitate the air's escape; or, on occasion, to give them air, as in frosty weather, &c. for want of which they are apt to burst. See PIPE.

Vent is likewise applied to the covers of wind-furnaces, whereby the air enters, which serves them for bellows, and which are stopped with registers or sluices, according to the degree of heat required, as in the furnaces of glass-houses, assayers, &c.

VENTER, BELLY, in anatomy, a cavity in the body of an animal, containing viscera, or other organs necessary for the performance of divers functions.

VENTER is also used in speaking of a partition of the effects of a father or mother, among children born, or accruing from different marriages.

VENTER is also used for the children whereof a woman is delivered at one pregnancy: thus, two twins are said to be of the same venter.

VENTER, or BELLY *of a muscle*, is the fleshy or belly-part thereof, as contradistinguished from the two tendons, its extremes, one whereof is called the head, and the other the tail, of the muscle. See the article MUSCLE.

VENTER DRACONIS, dragon's belly, in astronomy, denotes the middle of a planet's orbit, or that part most remote from the nodes, i. e. from the dragon's head and tail; being the part which has the greatest latitude, or is at the greatest distance from the ecliptic.

VENTIDUCTS, in building, are spiracles or subterraneous places, where fresh cool wind being kept, they are made to communicate, by means of tubes, funnels, or vaults, with the chambers or other apartments of a house, to cool them in sultry weather.

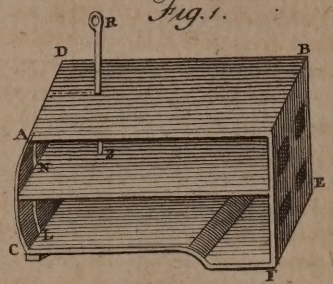
VENTILATOR, a machine by which the noxious air of any close place (as an hospital, gaol, ship, chamber, &c.) may be changed for fresh air.

The noxious qualities of bad air have been long known, though not sufficiently attended to, in practice; but it is to be hoped, that the indefatigable pains taken by Dr. Hales, to set the mischiefs arising from foul air in a just light, and the remedy he has proposed by the use of his ventilators, will at length prevail over that unaccountable sloth or obstinacy, which, where particular interests are not concerned, seems to possess the generality of mankind, and which rarely allows them to give due attention to any new discovery.

The ventilators invented by that ingenious gentleman, consist of a square box, ABCD (plate XC. fig. 1.) about ten feet long, five wide, and two deep; in the middle of which is placed a broad partition, or

Ventilators.

Fig. 1.



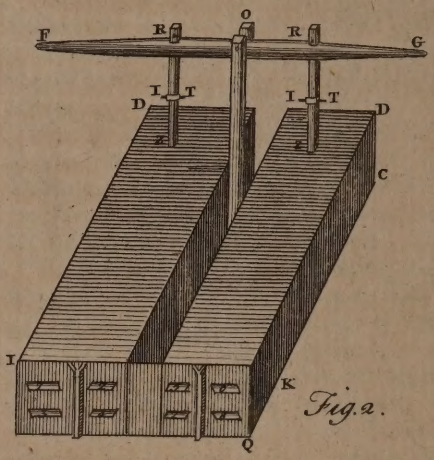


Fig. 2.

Fig. 3.

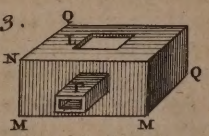


Fig. 4.

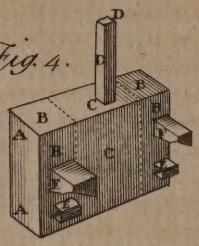


Fig. 5.

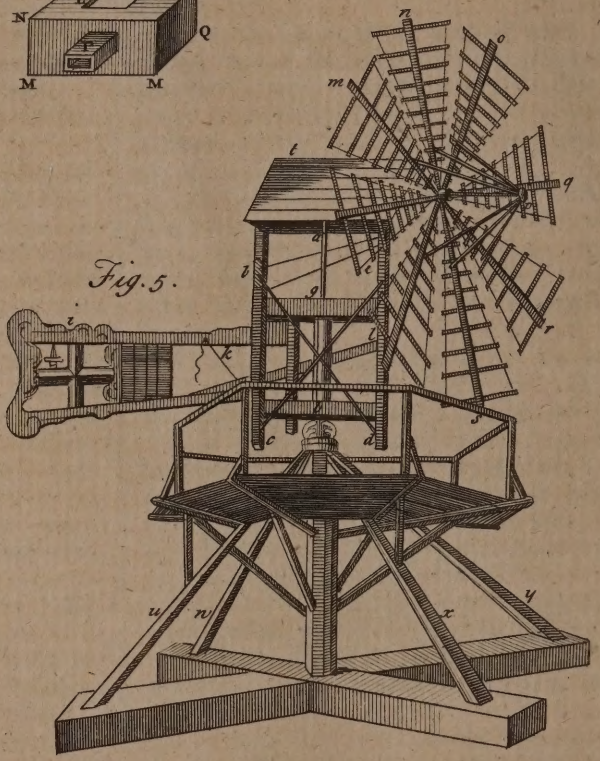
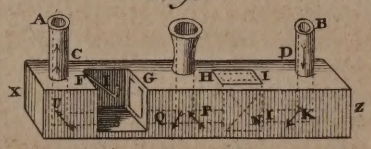


Fig. 6.



T. Lodge sculp.

or midriff, made to move up and down, from A to C, on hinges at the end E, by means of an iron rod Z R, fixed to the midriff at Z.

Another box, of the ſame ſize with the former, having a like midriff, bar, &c. is placed near the former (fig. 2.) with its rod, R Z. Both theſe rods are fixed to a lever F G, moveable on the center O; ſo that by the alternate riſing and depreſſing of the lever F G, the midriffs are alſo raiſed and depreſſed alternately, by which means theſe double bellows are at the ſame time both drawing and pouring out the air.

That the midriffs may be rendered lighter, they may be made of four bars, lengthwiſe, and as many placed acroſs them, each about three inches broad, and an inch thick, the vacant ſpaces being filled up with thin pannels of fir board.

In order to make the midriffs move with greater eaſe, and without touching the ſides of the boxes, there is an iron regulator N L (fig. 1.) fixed upright to the end A C of the box. As very little air will eſcape if the edges of the midriff be within one-twentieth part of an inch from the ſides of the box, there is no neceſſity for leathern ſides, as in common bellows. The end A C of the box muſt be ſomewhat circular, that it may be the better adapted to the riſing and falling of the midriff; and at the other end of the midriff a ſlip of leather may be nailed over the hinges.

To the ventilators above deſcribed, eight valves are adapted for the air to paſs through; theſe valves are placed at the hinge-end B Q, fig. 2. numbered 1, 2, 3, 4, &c. The valve 1 opens inward, to admit the air to enter, when the midriff is depreſſed at the other end, by means of the lever F G; and at the ſame time the valve 3, in the lower ventilator, is ſhut by the compreſſed air, which paſſes out at the valve 4: but when that midriff is raiſed, the valve 1 ſhuts, and the air paſſes out at the valve 2. The ſame is to be obſerved of the valves 5, 6, 7, 8, of the other box; ſo that when, by the motion of the lever F G, the midriffs are alternately riſing and falling, then two of the ventilators are conſtantly drawing in the air, and two of them at the ſame time are blowing it out at their proper valves, the air entering at the valves 1, 3, 6, 8, and paſſing out at the valves 2, 4, 5, 7. To the ventilators, before the valves, is fixed a hook Q Q M M (fig. 3.) as a common receptacle for all the air that comes out of theſe valves, which air is conveyed away thro' the trunk P, paſſing thro' the wall of a building, &c.

From the foregoing explanation, the nature of ventilators may be eaſily underſtood, and therefore we ſhall be briefer in the following deſcription of thoſe lately erected in Newgate, for exhauſting that priſon of its foul air. In this priſon then there are ſeven ventilators, each nine feet long, and four feet and a half wide; two pair of which are laid on each other: theſe ventilators are worked by means of a wind-mill.

The valves of the ventilators open into a large wooden box A B (fig. 4.) which is faſtened to the ventilators by the hooks A A: this box is divided into three ſpaces; the middle, or largeſt, C C, receives all the foul air diſcharged by the ventilators, whence it paſſes through a trunk D D, ſixteen inches wide, through the leads into the open air.

The outer ſpaces B B B B, receive the foul air through the trunks F F, from the ſeveral wards, from whence it is conveyed into the ventilators, through thoſe valves which open inward, and then diſcharged by the other valves of the ventilators, into the middle partition of the box, and from thence conveyed, by the pipe D D, into the open air.

Theſe ventilators are fixed in an upper room of Newgate, in order to be near the leads, where the wind-mill, which works them, is erected; and from each of the outer noſtrils F F, there are trunks, with ſliding ſhutters, paſſing into the ſeveral wards; ſo that by opening theſe trunks, any of the wards may be ventilated, either ſingly, or ſeveral at a time.

That the midriffs may not be ſpoiled for want of air, when all the trunks are ſhut, there are two holes cut in the outer noſtrils, at E E, which are covered with boxes twenty inches long, and fourteen wide. In the bottom of each of theſe boxes is a large moveable valve, of ſuch a weight as not to open but when all the other paſſages for the air are ſtopped: by means of theſe valves, the ventilators are ſupplied with air, when all the trunks, going into the ſeveral wards, are cloſed, and the midriffs are not in danger of breaking for want of it.

The wind-mill (fig. 5.) erected for working the ventilators, is deſigned to move with a ſmall degree of wind, that the ventilators may be the oftener worked.

The mill-poſt is fixed on four croſs-trees, and ſupported by the braces *u w x y*.

This poſt is hollow, that the iron rod *a*, may paſs through, the lower end of it being fixed to the lever of the ventilators.

The upper end of this rod goes to the iron axle-tree, which has a crank ſix inches long, and therefore gives a ſtroke of thirteen inches; and the other end being fixed to the lever, at a proper diſtance from the center of its motion, raiſes the midriffs fifteen inches.

The iron axle-tree extends about two feet beyond the face of the ſails, from the extremity of which, *p*, eight iron braces go to the vanes *m*, *n*, *o*, *p*, *q*, *r*, *s*, &c.

The frame turns on the poſt, on friction-wheels, ſo that the ſails always face the wind, by means of the vane *i*; *l* is the break-pole, which, by pulling the rope *k*, ſtops the mill; *b*, *d*, *c*, *e*, are iron braces, faſtened at each end with iron bolts, to keep the

 frame

frame from wracking. See the article WIND-MILL.

Fig. 6. repreſents an inſtrument invented for going with ſafety into damps, and other noxious air. XZ repreſents a ſquare piece of elder, or willow, a foot long, and two inches both in breadth and depth, with a hole, KLQU, five-eighths of an inch diameter, bored through it; and, at CD, ſhort foſſets, with like holes bored through them; to which foſſets, hollow reed-canes are to be fixed by means of ſhort ſupple leathern pipes, ſo as to be flexible at theſe joints. N, T, S, are ſquare holes, two inches deep, and an inch and three quarters wide, with their leathern covers FG, HI, nailed over them.

IN is a broad leathern valve, moving on joints at I, ſo as to open, by the force of the air, which paſſes down the pipe BKL, when the breath is drawn in at the mouth at the middle foſſet, which ſtands five eighths of an inch above GH. GS is another like valve, which ſhuts the hole, at Q, cloſe, while the breath drawing in, through the middle foſſet; but when, on the contrary, the perſon breathes out through the middle foſſet, the valve IN cloſes the hole L, and the other valve GS opens for the breath to paſs freely off through the pipe UA; by which means the perſon always draws in freſh air. There are two ſtiff wires as T, fixed to prevent the valves opening too far, leſt the force of the breath, which is but ſmall, ſhould not ſhut them. This inſtrument is to be fixed to the mouth by a tape, or cord, tied round the head; and it will be convenient to have cuſhions at the corners C and D, for the cheeks to bear off a part of the preſſure. By the help of this inſtrument a perſon may go into a ſuffocating air, as in ſome mines, &c. his noſtrils being ſtopped with cotton, without any danger of ſuffocation.

VENTRICLE, *ventriculus*, properly denotes any little cavity; but is more particularly uſed, by phyſicians and anatomiſts, for the ſtomach. See STOMACH.

For thoſe cavities of the heart and brain, called ventricles, ſee HEART and BRAIN.

VENTRILOQOUS, an appellation given to the engaſtrimythi.

VENUS, in aſtronomy, one of the inferior planets, revolving round the ſun, in an orbit between that of mercury and the earth.

According to Mr. Caſſini, the greateſt diſtance of Venus from the earth is 38415, the mean diſtance 22000, and the leaſt diſtance 5585, ſemi-diameters of the earth. Her diſtance from the ſun is $\frac{7233}{10000}$ of the earth's diſtance from the ſun: her excentricity 5; the inclination of her orbit 3° 23′; and her parallax 3′. See the articles DISTANCE, EXCENTRICITY, &c.

The ſemi-diameter of Venus is to that of the earth as 10 to 19; her periodical courſe round the ſun is performed in 224 days, 17 hours; and her motion round her own axis in 23 hours. See the articles, DIAMETER and PERIOD.

Venus is eaſily diſtinguiſhed by her brightneſs and whiteneſs, which exceeds that of all the other planets, and which is ſo conſiderable, that in a duſky place ſhe projects a ſenſible ſhadow. She conſtantly attends the ſun, and never departs from him above 47°. When ſhe goes before the ſun, that is, riſes before him, ſhe is called Phoſphorus, or Lucifer, or the morning ſtar; and when ſhe follows him, that is, ſets after him, Heſperus, or veſper, or the evening ſtar.

The eye in Venus will behold four planets above it, viz. our earth, Mars, Jupiter, and Saturn; and one below it, which is Mercury: and when our earth is in oppoſition to the ſun, it will appear then (in the night) to ſhine with a full orb, and be very bright. The moon will appear always to accompany the earth, and never to be ſeen from her above half a degree. Mercury will never appear to be above 38° diſtant from the ſun.

October 14, 1666, N. S. Caſſini obſerved ſeveral ſpots in the body of this planet, by whoſe motion he judged (though he was not certain) that ſhe moved either by a circulation, or a kind of libration round her axis, in about 23 hours.

A. D. 1672, and 1686, the ſame aſtronomer, with a teleſcope of 34 feet, believes he ſaw a ſatellite moving round this planet, and diſtant from it about three-fifths of Venus's diameter. It had the ſame phaſes with Venus, but was without any well defined form, and its diameter ſcarce one fourth of that of Venus.

Dr. Gregory thinks it more than probable, that this was a ſatellite; and ſuppoſes the reaſon why it is not uſually ſeen, to be the unfitneſs of its ſurface to reflect the rays of the ſun's light; as is the caſe of the ſpots in the moon, of which, if the whole diſc of the moon were compoſed, he thinks that the planet could not be ſeen in Venus.

Venus, when viewed through a teleſcope, is rarely ſeen to ſhine with a full face, but has phaſes juſt like thoſe of the moon, being now gibbous, now horned, &c. and her illuminated part conſtantly turned towards the ſun, i. e. looks towards the eaſt, when Phoſphorus, and towards the weſt when Heſperus. See PHASES.

M. De la Hire, in 1700, through a teleſcope of ſixteen feet, diſcovered mountains in Venus, which he found to be larger than thoſe in the moon.

Sometimes ſhe is ſeen in the diſc of the ſun, in form of a dark round ſpot. See the article TRANSIT.

The phænomena of Venus evidently ſhew the falſity of the Ptolemaic ſyſtem, for that ſyſtem ſuppoſes that Venus's orb incloſes the earth.

VENUS, in chemiſtry, the ſame with copper. See the article COPPER.

VENUS-LOOKING-GLASS, in botany, the Engliſh name for a ſpecies of campanula. See CAMPANULA.

VENUS-NAVELWORT, in botany, a ſpecies of cynogloſſum. See CYNOGLOSSUM.

VERATRUM, white hellebore, in botany, a genus producing hermaphrodite and male flowers on the ſame plant, each containing ſix oblong, lanceolated, perſiſtent petals, with ſix ſubulated filaments topped with quadrangular antheræ; the male flower is barren, but the hermaphrodite is ſucceeded by three oblong, erect, compreſſed capſules, each having but one cell, containing many oblong, compreſſed, membranaceous ſeeds.

White hellebore root is oblong and tuberoſe, duſky without and white within, with a great number of whitiſh fibres; the leaves are oblong, oval, large, rounded at their extremities, and have many longitudinal plaits; the ſtalks riſe to about three or four feet high, branching out on every ſide; under each branch is placed a narrow plaited leaf; the branches and ſtalk are terminated with ſpikes of flowers, which appear in June and July. It grows naturally in ſeveral parts of Germany and Switzerland; the root is the only part uſed in medicine; the taſte is acrid, a little bitteriſh, ſubaſtringent, diſagreeable and nauſeous; the inward uſe is not very ſafe, nor indeed the outward; for when the powder is applied to an iſſue, it will occaſion violent purging; when taken inwardly, it is a ſtrong emetic, and has been obſerved ſometimes to occaſion convulſions and other terrible diſorders; however, in deſperate caſes, it may be ſometimes ventered upon, particularly againſt madneſs; the doſe in this diſeaſe is a ſcruple; though even in this caſe it muſt be uſed with the utmoſt caution.

VERB, in grammar, a word ſerving to expreſs what we affirm of any ſubject, or attribute to it; or, according to others, it is a word principally uſed to ſignify the affirmation, and ſhews that the diſcourſe, wherein it is uſed, is that of a man, who not only has a conception of things, but judges or affirms ſomething of them: though it is principally uſed in this ſenſe, yet it is made uſe of alſo to ſignify other motions of the ſoul, as to deſire, to pray, to command; but this it only does by changing the mood or inflexion.

The verb, in its primary ſignification, ſhould have no other uſe, but to mark the connexion which we make in the mind, between the two terms of a propoſition: but the *eſſe*, *to be*, is the only one that has retained this ſimplicity; nor, in ſtrictneſs, has this retained it, but in the third perſon, as *eſt*, *is*. Men being naturally inclined to ſhorten their expreſſions, to the affirmation they have almoſt always added other ſignifications, in the ſame word, ſo as that two words make a propoſition; as in *Petrus vivit*, *Peter lives*; where *vivit* includes both the attribute and affirmation; it being the ſame thing to ſay, *Peter lives*, as that *Peter is living*; and hence the great variety of verbs in every language.

To conſider ſimply what is eſſential to a verb, the only true definition is, a word ſignifying an affirmation; but if we ſhould chuſe to add its principal accidents, it may be defined thus; a word which ſignifies affirmation, with the deſignation of perſon, number, and time.

Verbs are variouſly divided: with reſpect to the ſubject, they are divided into active, paſſive, neuter, &c. with reſpect to their inflections, into regular, irregular, perſonal, imperſonal, auxiliary, ſubſtantive, &c.

A verb active is a verb which expreſſes an action that falls on another ſubject or object; ſuch as, *I love*, *I work*, &c. which ſignify the action of loving, working, &c. of theſe there are three kinds; the one called tranſitive, where the action paſſes to a ſubject different from the agent; reflected, where the action returns upon the agent; and reciprocal, where the action returns mutually upon the two agents that produced it.

A verb paſſive is that which expreſſes a paſſion, or which receives the action of ſome agent; and which is conjugated in the modern tongues, with the auxiliary verb *I am*, *je ſuis*.

A verb neuter, is that which ſignifies an action that has no particular object whereon to fall, but which of itſelf takes up the whole idea of the action, as, *I ſleep*, *thou yawneſt*, *he ſnores*, *we walk*, *you run*, *they ſtand*: the Latins called them neuters, becauſe they are neither active nor paſſive, though they have the force and ſignification of both.

Of theſe verbs, ſome form their tenſes by the auxiliary verb *to have*, as *I have ſlept*, *ye have run*; and they are called neuter actives. There are others which form their compound parts by the auxiliary *to be*, as *I am come*; theſe are called neuters paſſive.

A verb ſubſtantive is that which expreſſes the being or exiſtence of a thing, as *I am*, *thou art*.

Auxiliary or helping verbs, are thoſe which ſerve in conjugating active and paſſive verbs, ſuch as *I am*, *I have*, &c.

Verbs in Engliſh, and moſt modern tongues, do not change their terminations, as in Latin, to expreſs the ſeveral times, modes, &c. but they make uſe of auxiliaries, as *have*, *am*, *be*, *do*, *will*, *ſhall*, &c.

Regular verbs are thoſe which are conjugated after ſome one manner, rule, or analogy.

Irregular or anomalous verbs, are ſuch as have ſomething ſingular in the terminations or formations of their tenſes.

Verbs imperſonal are thoſe which have only the third perſon, as *it behoves*, &c.

VERBAL, ſomething that belongs to verbs, or even to words of any kind ſpoken with the mouth.

Thus,

Thus, verbal nouns, among grammarians, are thoſe formed of verbs.

Again, a verbal contract is one made merely by word of mouth, in oppoſition to that made in writing.

VERBASCUM, mullein, in botany, a genus of plants, whoſe flower is monopetalous and rotated; the tube is very ſhort and cylindric; and the limb is divided into five ovate, obtuſe, patent ſegments: the ſtamina are five ſubulated declining filaments, topped with roundiſh, compreſſed, erect antheræ: the fruit is a roundiſh bilocular capſule, containing numerous angulated ſeeds.

There are ſeveral ſpecies of mullein; the common ſort, which grows by the ſide of highways and banks in moſt parts of England, is a biennial plant, whoſe root is oblong, thickiſh, woody, with a few fibres; the lower leaves which ſpread on the ground, are long, broad, woolly, of a yellowiſh white colour, having ſcarce any footſtalk: the ſtalk riſes to the height of four or five feet, the lower part is furniſhed with leaves, and the upper terminates in a ſpike of yellow flowers, which appear in July, and are of an agreeable odour.

The leaves of mullein are ſaid to ſoften tumours, cool inflammations, and eaſe pains; they are recommended in diſtempers of the breaſt, coughs, and ſpitting blood; the flowers are reckoned pectoral, and proper to abate the acrimony of the humours, to cure itching, and the outward and inward piles; an extract prepared from them by rectified ſpirit of wine, taſtes extremely pleaſant.

VERBENA, vervian, in botany, a genus of plants, whoſe flower is monopetalous and unequal; the tube is cylindric and incurved; and the limb is divided into five roundiſh ſegments: there is ſcarce any pericarpium; but the ſeeds, which are either two or four, are contained in the cup.

The common vervian with a blue flower, which grows near towns and villages in many parts of England, is looked upon as detergent and vulnerary; it is of a ſubaſtringent and bitteriſh taſte, and reckoned good in all indurations and obſtructions of the liver, ſpleen, reins, meſentery; but it is little uſed inwardly: externally, it is of great uſe in pains of the head; it was formerly accounted good againſt agues, but now we have better medicines, though ſome pretend that the bark, taken in a decoction of it, is rendered much better thereby.

VERBERATION, ſmiting, in phyſics, a term uſed to expreſs the cauſe of ſound, which ariſes from a verberation of the air, when ſtruck in divers manners by the ſeveral parts of the ſonorous body firſt put into a vibratory motion.

VERBESINA, in botany, a genus of plants, whoſe flower is compound and radiated, conſiſting of many hermaphrodite florets which form the diſc, and a few ligulate female corollulæ which compoſe the rays; there is no pericarpium, but the cup, which is concave, contains the ſeeds, which are thick, angulated, and crowned with a three-pointed chaff.

This genus comprehends the eupatoriophalacron of Vaillant and Dillenius.

VERDEGREASE, or VERDEGRIS, a kind of ruſt of copper, much uſed by painters as a green colour.

Verdegreaſe is properly no other than copper, diſſolved by a mild acid into the form of an ærugo, or ruſt. After preſſing the grapes for wine, the huſks, ſtones, and other refuſe are laid to be dried in the ſun; they are then moiſtened with the ſtrongeſt wine that can be had, and laid together in veſſels till they begin to ferment; after nine or ten days the matter is preſſed, and worked into balls between the hands, and and laid in an orderly manner over the bottom of an earthen veſſel, and as much wine is laid over them as will cover them half way up. The veſſels are then covered with a looſe lid, and ſet in a cellar where the balls are left in the wine about fifteen hours, a perſon turning them four or five times in that ſpace, in order to make the wine ſoak perfectly through them; after this, ſome wooden bars are placed acroſs the veſſel, about half an inch above the ſurface of the wine, and the balls are laid out of the wine upon theſe; the veſſels are then ſhut up, and the whole left in this ſtate for ten days or more: at the end of this time the balls emit a very penetrating ſcent, and are fit for diſſolving copper. They are now to be broke to pieces, and the outſide mixed with the internal part, which is moiſter; they are then laid with thin plates of copper, ſtratum ſuper ſtratum, in the ſame veſſels upon the bars, and the whole is left for a week or a fortnight, at the end of which time the plates are found covered with verdegreaſe, which is not taken off immediately: but they are wrapped up in cloths wetted with wine, and laid by a week or more, and then the ærugo or verdegreaſe is taken off for uſe.

This ruſt of copper is rarely uſed internally, nor ought it, unleſs in the moſt deſperate caſes, where an inſtantaneous vomiting is neceſſary. Externally it is much uſed as a detergent or deſiccative: it eats off fungous fleſh in ulcers, and, mixed with honey, is uſed in aphthæ and ulcerations of the mouth. It is the baſis of what is called the Egyptian ointment, and of many other compoſitions in the ſame intention. There is a preparation of this ærugo of copper, in ſome uſe at preſent both in medicine and in painting, which ought not to be omitted here: it is called, though very imperfectly, diſtilled verdegreaſe; it is a cryſtallization of verdegreaſe, prepared thus: bruiſe to a coarſe powder ſome fine green verdegreaſe, pour on it diſtilled vinegar; to the remainder continue to do this, till the liquor will no longer extract any colour from the maſs. Evaporate or diſtil theſe liquors, all mixed together, till a pellicle covers the ſurface, then ſet it in a cellar, and it will ſhoot into fine

fine green cryſtals. Evaporate the remainder of the liquor, and ſet it to ſhoot again till no more will be produced. Theſe are the cryſtals of verdegreaſe, improperly called diſtilled verdegreaſe. They are better than the crude ſubſtance, for eating away proud fleſh. A ſolution of them in common water is an excellent detergent for old ulcers; and they are uſed in common eye-waters, to clear away ſpecks and films. Theſe cryſtals, diſtilled in a retort, afford, after an uſeleſs phlegm is come over, a noble acid, the richeſt that can be procured from vinegar. It is, by the chemical writers, called acetum eſuriens; it is greatly celebrated for its virtues as a menſtruum, and worthy great praiſe, tho' not equal to all that is ſaid of it.

VERDERER, or VERDEROR, a judicial officer of the king's foreſt, whoſe buſineſs it is to look to the vert, and ſee it well maintained.

VERDICT, is the anſwer of the jury given to the court, concerning the matter of fact, in any caſe civil or criminal, committed by the court to their trial and examination.

A verdict is either general or ſpecial. A general verdict is that which is brought into the court in like general terms as the general iſſue, as, in an action of diſſeiſin, the defendant pleads no wrong, no diſſeiſin. Then the iſſue is general, whether the fact be wrong or not, which being committed to the jury, they, upon conſideration of the evidence, come in and ſay, either for the plaintiff, that it is a wrong diſſeiſin; or for the defendant, that it is no wrong diſſeiſin.

A ſpecial verdict, is, when they ſay at large, that ſuch and ſuch a thing they found to be done by the defendant or tenant; declaring the courſe of the fact, as in their opinion it is proved; and praying the judgment of the court, as to what is law in that caſe.

It is ſaid, that a jury may give a general or ſpecial verdict, in all actions, and caſes; and that the court is obliged to receive it, provided it be pertinent to the point in iſſue: alſo if the jury will take upon them to bring in any thing that is matter of law, their verdict ſhall be received.

Verdicts are alſo public and private; public, when the ſame are given in open court; and private, when given out of court, before any of the judges: but a private verdict, in ſtrictneſs, is looked upon to be no verdict.

VERDITER, or VERDETER, a kind of mineral ſubſtance, ſometimes uſed by the painters, &c. for a blue; but more uſually mixed with a yellow for a green colour.

Verditer, according to Savary, ought to be made of the lapis armenus; or at leaſt of an earthy ſubſtance much like it, brought from the mountains of Hungary, &c. only prepared by powdering it, and cleaſing it by lotion.

But this ſtone being very rare, the verditer commonly uſed is not a native, but a factitious, ſubſtance; which ſome ſay is prepared by caſting wine or water upon new copper, as it comes red hot out of the furnace, and catching the ſteams that riſe from it upon copper-plates; others again ſay, it is prepared by diſſolving copper-plates in wine, much after the manner of verdegreaſe.

But the method of making it in England is as follows:

The refiners pour their copper-water into an hundred pound weight of whiting, ſtirring them well together every day for ſome hours, till the water grows pale; then they pour that off, and ſet it by for further uſe, and pour on more of the green water, repeating this till the verditer is made; which they then take out, and lay on large pieces of chalk in the ſun to dry.

The water which is poured off from the verditer, (which remains at the bottom of the tub) is put into a copper, and boiled till it comes to the conſiſtence of water-gruel; now, conſiſting principally of ſalt-petre reduced, moſt of the ſpirit of vitriol being gone with the copper into the verditer; and a diſh full of this being put into the other materials for aqua-fortis, is rediſtilled, and makes what they call a double water, which is near twice as good as that made without it.

VERDOY, in heraldry, denotes a bordure of a coat of arms, charged with any kinds or parts of flowers, fruits, ſeeds, plants, &c.

VERGE, ſignifies the compaſs of the king's court which bounds the juriſdiction of the lord ſteward of the houſhold; and which is thought to have been twelve miles round.

The term verge is alſo uſed for a ſtick or rod, whereby one is admitted tenant to a copyhold eſtate, by holding it in his hand, and ſwearing fealty to the lord of the manor.

VERGERS, certain officers of the courts of king's bench and common pleas, whoſe buſineſs it is to cary white wands before the judges.

There are alſo vergers of cathedrals and collegiate churches, who carry a rod tipped with ſilver before the biſhop, dean, &c.

VERGETTE, in heraldry, denotes a pallet, or ſmall pale; and hence, a ſhield divided by ſuch pallets, is termed vergette.

VERGILIÆ, in aſtronomy, a conſtellation, the appearance of which denotes the approach of ſpring: it is the ſame with pleiades. See PLEIADES.

VERIFICATION, in general, is the act of proving a thing; but among the French, it only ſignifies the recording of the king's edicts by the parliament.

VERJUICE, a liquor obtained from grapes or apples, unfit for wine or cyder; or from ſweet ones, whilſt yet acid and unripe. Its chief uſe is in ſauces,

ragouts, &c. though it is alſo an ingredient in ſome medicinal compoſitions, and is uſed by the wax-chandlers to purify their wax.

VERMICELLI, or VERMICHELLY, a compoſition of flour, cheeſe, yolks of eggs, ſugar, and ſaffron, reduced to a paſte, and formed into long ſlender pieces like worms, by forcing it with a piſton through a number of little holes.

It was firſt brought from Italy, where it is in great vogue: it is chiefly uſed in ſoups and pottages, to provoke venery, &c.

VERMICULAR, an epithet given to any thing that bears a relation or reſemblance to worms, vermiculi. See WORM.

Anatomiſts particularly apply it to the motion of the inteſtines and certain muſcles of the body.

The vermicular or periſtaltic motion of the inteſtines is performed by the contraction of the fibres thereof, from above downwards; as the antiperiſtaltic motion is by their contraction from below upwards.

VERMIFORMIS, in anatomy, a term applied to various parts in the human body, bearing ſome reſemblance to worms. As ſome muſcles, proceſſes, &c.

Proceſſus, or *apophyſes* VERMIFORMES, two extremities of the cerebellum, ſituate near the fourth ventricle of the brain.

VERMIFORMES *muſculi*, are the four muſcles in each hand and foot, which bring the fingers and toes towards the thumbs and great toes, called alſo lumbricales.

VERMILION, a very bright and beautiful red colour, in great eſteem among the ancients, under the name of minium. There are two kinds of it, the one natural, and the other factitious. The natural is found in ſome ſilver mines, in the form of a ruddy ſand, which is afterwards prepared and purified by ſeveral lotions and coctions. The artificial is made of mineral cinnabar, ground up with aqua-vitæ and urine, and afterwards dried.

It is alſo made of lead burnt and waſhed, or of ceruſs prepared by fire: but this is not properly called vermilion, but minium, or red-lead. See MINIUM.

Yet this laſt, however, ſeems to be the real vermilion of the ancients; and both apothecaries and painters ſtill give it the name, to enhance the price.

We have two kinds of vermilion from Holland, the one of a deep red, the other pale; but it is the ſame thing at the bottom: the only difference of colour proceeding from the cinnabar's being more or leſs ground: when the cinnabar is finely ground, the vermilion is pale: and this is preferred before that which is coarſer and redder.

It is of very great uſe with painters in oil and miniature; and among the ladies for a fucus, or paint, to heighten the complexion of ſuch as are too pale.

Some diſapprove of vermilion to be uſed in painting prints, unleſs it be prepared by waſhing, as is directed for minium; and then chiefly for dry painting, except it be by thoſe perſons who can uſe it moderately, and with judgment; for all heavy colours will drown the ſhades or ſtrokes of the engraver.

VERMIN, *vermina*, a collective name including all kinds of little animals, or inſects, which are hurtful or troubleſome to men, beaſts, fruits, &c. as worms, lice, fleas, caterpillars, ants, flies, &c.

VERMINATION, *verminatio*, the act of breeding worms, and other vermin; particularly bots, in cattle, &c.

VERMINATION, is ſometimes alſo uſed, among phyſicians, for a ſort of tormina, ventris, or wringing of the guts, wherein the patient is affected, as if worms were gnawing his inteſtines.

VERMIVOROUS ANIMALS, are ſuch as feed upon worms.

VERNACULAR, is applied to any thing that is peculiar to ſome one country.

VERNAL, ſomething belonging to the ſpring ſeaſon.

Hence vernal leaves, are thoſe leaves of plants which come up in the ſpring. Vernal ſigns, are thoſe which the ſun is in during the ſpring ſeaſon, viz. Aries, Taurus, and Gemini. Vernal equinox, is that which happens when the ſun is aſcending from the equator towards the north pole.

VERNIER, or NONIUS, among the mathematicians, a ſcale of diviſions, ſerving to cut the diviſions of an arch into ſingle minutes.

VERONICA, ſpeedwell, in botany, a genus of plants, whoſe flower is monopetalous and rotaled, with the limb divided into four ovate plane ſegments; the ſtamina are two riſing filaments, topped with oblong antheræ; the fruit is a heart ſhaped capſule, with the top compreſſed, having two cells which contain many roundiſh ſeeds.

The common male ſpeedwell, or fluellin, has a ſlender, fibrous, ſpreading root, which ſends forth ſeveral ſlender, long, round, knotted, hairy ſtalks, generally lying on the ſurface of the ground; the leaves grow by pairs oppoſite to each other, and are oval, downy, and dentated on the edges, and have a bitter acrid taſte; the flowers are diſpoſed in ſpikes ariſing from the wings of the ſtalks, they are ſmall and bluiſh, ſometimes white, and appear in June: it grows wild in the woods and other ſhady places in divers parts of England. There are ſeveral other ſpecies belonging to this genus which are noted in medicine, but the above-mentioned is held moſt in eſteem; it is accounted a good deterging vulnerary, and given in eroſions and obſtructions of the lungs; both to expectorate and heal, there are alſo alexipharmic qualities aſcribed to it, which give it a place in ſome compoſitions againſt malignities and epidemical infections; it is alſo preſcribed in ſome antiſcorbutic decoctions, and reckoned good to cleanſe the blood, and wear away blotches and cutaneous erup-

eruptions; it is alſo ſaid to be excellent in the gravel, and is beſt uſed in the manner of tea; and is very good in ſleepy diſorders.

VERSE, *verſus*, in poetry, a line or part of a diſcourſe, conſiſting of a number of long and ſhort ſyllables, which run with an agreeable cadence, the like being alſo reiterated in the courſe of the piece.

This repetition, according to F. Boſſu, is neceſſary to diſtinguiſh the notion of verſe from that of proſe; for in proſe, as well as verſe, each period and member are parts of diſcourſe, conſiſting of a certain number of long and ſhort ſyllables; only proſe is continually diverſifying its meaſures and cadences, and verſe regularly repeating them. This repetition of the poets appears even in the manner of writing; for one verſe being finiſhed, they return to the beginning of another line, to write the verſe following, and it is to this return, that verſe owes its name.

To make verſe, it is not enough that the meaſures and quantities of ſyllables be obſerved, and ſix juſt feet put one after another in the ſame line. There are further required, certain agreeable cadences, particular tenſes, moods, regimens, and even ſometimes words unknown in proſe. But what is chiefly required, is an elevated, bold, figurative manner of diction; this manner is a thing ſo peculiar to this kind of writing, that without it, the moſt exact arrangements of longs and ſhorts does not conſtitute verſe ſo much as a ſort of meaſured proſe. The Greek and Latin verſes conſiſt of a certain number of feet, diſpoſed in a certain order; and ſome have attempted to make French and Engliſh verſes on the ſame foundation, but without ſucceſs. Voſſius is very ſevere on the modern verſe, and makes it altogether unfit for muſic. Our verſes, ſays he, run all as it were upon one foot, without diſtinction of members or parts, and without regard to the natural quantities of ſyllables. We have no rhythmus at all, and we mind nothing but to have a certain number of ſyllables in a verſe of whatever nature, and in whatever order. Mr. Malcolm vindicates our verſe from this imputation. It is true, ſays he, we do not follow the metrical compoſition of the ancients, yet we have ſuch a mixture of ſtrong and ſoft, long and ſhort, ſyllables, as make our verſes flow ſmooth or rumbling, ſlow or rapid, agreeable to the ſubject. Inſtances of all which we have in the following lines of Pope.

Theſe equal ſyllables alone require,
Tho' oft' the ear the open vowels tire,
While expletives their feeble aid do join,
And ten low words oft' creep in one dull line.
Soft is the ſtrain when Zephyr gently blows.
And the ſmooth ſtream in ſmoother numbers flows;
But when loud billows laſh the ſounding ſhore,
The hoarſe rough verſe ſhould like the torrent roar;
When Ajax ſtrives ſome rock's vaſt weight to throw,
The line too labours, and the words move ſlow.
Not ſo when ſwift Camilla ſcours the plain,
Flies o'er th' unbending corn, and ſkims along the main.

By making a ſmall change or tranſpoſition of a word in any of theſe verſes, any body who has an ear will find, that we make a great matter of the nature and order of the ſyllables. See NUMBERS.

Voſſius adds, that the ancient odes were ſung as to the rhythmus, in the ſame manner as we ſcan them, every pes being a diſtinct bar, or meaſure ſeparated by a diſtinct pauſe, though in reading, that diſtinction was not accurately obſerved. Laſtly, he obſerves, that their odes had a regular return of the ſame kind of verſe, and the ſame quantity of ſyllables, in the ſame place of every verſe; whereas, in the modern odes, to follow the natural quantity of our ſyllables, every ſtanza would be a diſtinct ſong.

Verſes are of various kinds, ſome denominated from the number of feet, whereof they are compoſed, as the monometer, dimeter, trimeter, tetrameter, pentameter, hexameter, &c.

Some alſo, from the kinds of feet uſed in them, as the pyrrhichion, proceleuſmatic, iambic, trochaic, &c.

Sometimes verſes are denominated from the names of the inventors, or the authors who have uſed them with moſt ſucceſs, as the anacreontic, archilochian, aſclepia, alcaic, ſapphic, &c.

The moderns have invented heroic or alexandrine verſes; the ancients likewiſe invented various kinds of poetical devices in verſe, as centos, echos, &c.

VERSE is alſo uſed for a part of a chapter, ſection, or paragraph, ſubdivided into ſeveral little articles. The whole Bible is divided into chapters, and the chapters are ſubdivided into verſes. The diviſion of verſes in the New Teſtament was firſt made by one Robert Stephens, with which diviſion many learned men find great fault, and yet it is every where followed.

VERSED *ſine of an arch*, a ſegment of the diameter of a circle, lying between the foot of a right ſine, and the lower extremity of the arch. See SINE.

VERSIFICATION, the art or manner of making verſe; alſo the tone and cadence of verſe.

Verſification is properly applied to what the poet does more by labour, art, and rule, than by invention, and the genius or furor poeticus. See POETRY, &c.

VERSION, a tranſlation of ſome book or writing, out of one language into another.

VERT, in heraldry, the term for a green colour. It is called vert in the blazon of the coats of all under the degree of nobles; but in coats of nobility, it is called emerald; and in thoſe of kings, venus. In engraving, it is expreſſed by diagonals, or

or lines drawn athwart from right to left, from the dexter chief corner to the ſiniſter baſe.

VERT, or GREEN HUE, in foreſt law, any thing that grows and bears a green leaf within the foreſt, that may cover a deer. This is divided into over-vert and nether-vert; over-vert is the great woods which in law-books are uſually called hault-bois; nether-vert is the under woods, otherwiſe called ſub-bois. We ſometimes alſo meet with ſpecial vert, which denotes all trees growing in the king's woods within the foreſt; and thoſe which grow in other men's woods, if they be ſuch trees as bear fruit to feed the deer.

VERTEBRÆ, in anatomy, the twenty-four bones of which the ſpine conſiſts, and on which the ſeveral motions of the trunk of our bodies are performed.

Each of theſe vertebræ is compoſed of its body and proceſſes. The body is the thick, ſpungy, anterior part, which is convex before, concave backwards, horizontal and plain in moſt of them above and below; their anterior and poſterior ſurfaces having ſeveral holes made in their thin external plate, both for the firmer connexion of the ligaments, and for the paſſages of veſſels into their cellular ſubſtance. Between theſe bodies of each two adjoining vertebræ, a ſubſtance between the nature of ligament and cartilage is interpoſed; which is compoſed of concentrical curve fibres, the exterior of which are the moſt ſolid and hard, while thoſe in the centre are very ſoft and full of a glairy liquor; and therefore this ſubſtance was called by the ancients ligamentum mucoſum. This is firmly fixed to the horizontal ſurfaces of the bodies of the vertebræ, and therefore not only allows theſe bones to recede from each other, and to be preſt cloſer together without breaking, but ſerves to connect them, in which it is aſſiſted by a ſtrong membranous ligament, which lines all their concave ſurface, and by ſtill a ſtronger ligament that covers all their anterior convex ſurface. It may be obſerved, as a general rule, notwithſtanding ſome exceptions, that the bodies of the vertebræ are ſmaller and more ſolid above, but as we reckon downwards, appear larger and more ſpungy, and that the cartilages between them are thick, and the ſurrounding ligaments ſtrong in proportion to the largeneſs of the vertebræ, and the quantity of motion they are to perform: by which diſpoſition the greater weight is ſupported on the broadeſt beſt ſecured baſe, and the middle of our body is allowed a large and ſecure motion, which is of conſiderable benefit. From each ſide of the body of each vertebra, a bony bridge is produced backwards and to a ſide; from the poſterior extremity of which, one ſlanting proceſs riſes, and another deſcends; the ſmooth, and what is generally the flatteſt ſide of each of theſe four proceſſes, which are called the oblique, is covered with a ſmooth cartilage, and the two inferior oblique proceſſes of each vertebra are fitted to, and articulated with, the two ſuperior or aſcending oblique proceſſes of the vertebra below.

From between the ſuperior and inferior oblique proceſs of each ſide, the vertebra is ſtretched out laterally in form of a proceſs, that is univerſally named tranſverſe. From the poſterior roots of the two oblique, and of the tranſverſe proceſs of each ſide, a broad oblique bony plate is extended backwards; where theſe meet, the ſeventh and laſt proceſs of the vertebræ takes it riſe and ſtands out backwards; this being generally ſharp-pointed, and narrow-edged, has therefore been called ſpinal proceſs, from which this whole chain of bones has got the name ſpina. Beſides the common ligament which lines all the interior ſurface of theſe proceſſes as well as of the bodies, there are particular ligaments that connect the proceſſes of each two contiguous vertebræ. The ſubſtance of the proceſſes is conſiderably ſtronger and firmer than that of the bodies of the vertebræ, having a thicker external plate, and without ſo many large holes in it. The ſeven proceſſes conſidered conjunctly, as forming the poſterior ſhares of the vertebræ, are hollow at their anterior middle part; which concavity, joined with that at the poſterior part of the bodies, makes one great foramen, which anſwers to ſuch another in the vertebræ above and below; therefore the foramina of all the vertebræ taken together, form a long great conduit, which is widened or ſtraitened in proportion to the ſize of the medulla ſpinalis, which it contains.

In the lateral bridges, which join the bodies to the proceſſes of each vertebra, a ſemicircular notch is obſervable both above and below; which, exactly correſponding with others in the contiguous bones, when the vertebræ are joined, form a round hole in each ſide, between each two vertebræ, through which the nerves that proceed from the medulla ſpinalis and the blood veſſels paſs. The articulations then of theſe true vertebræ are plainly double; for their bodies are joined by ſynchondroſis, and their oblique proceſſes are articulated by the third ſort of ginglymus. Hence it is evident, that their centre of motion is altered in different poſitions of the trunk. For when we bow forwards the ſuperior moved part bears entirely on the bodies of the vertebræ; if we bend back, the oblique proceſſes ſupport the weight; if we recline to one ſide, we reſt upon the oblique proceſſes of that ſide and part of the bodies; if we ſtand erect, all the bodies and oblique proceſſes have their ſhare in our ſupport.

There are in all twenty-four vertebræ: the neck conſiſts of ſeven; and in theſe, as in the others, we are to obſerve ſome things in general; and afterwards, other things in particular.

The vertebræ of the neck are ſmaller than thoſe of the back; but they are of a firmer conſiſtence, and harder: their body is more compreſſed than in the others, and is ſituated on the other part, and convex below.

Moſt of theſe vertebræ have nine apophyſes; the tranſverſe and poſterior ones, called the ſpinoſe apophyſes, are uſually bifurcated: the tranſverſe ones are perforated alſo, for the paſſage of the vertebral veſſels to the head.

In the conſideration of the vertebræ of the neck ſingly, we are to obſerve, that the upper one has a peculiar name; it is called atlas. This wants the body and the ſpinoſe apophyſes, and approaches to the figure of a ring: its ſubſtance is more ſolid than that of any other, and it receives both above and below; but it is not received itſelf.

The head is articulated at its interior part, and it is by means of this articulation that the head is bent, and extended.

The proper foramen is greater in this than in any other vertebra, which ariſes from its wanting the body: the tranſverſe proceſſes are alſo longer than in the others. It has alſo a peculiar ſemi-circular ligament, by which it embraces the dentiform proceſs of the ſucceeding vertebra.

The ſecond vertebra is called epiſtrophæus, and axis; in which we are to obſerve the dentiform or odontoide proceſs, juſt mentioned; whereby it articulates in the manner of a hinge, with the firſt vertebra, and the rotatory motion of the head is performed by means of it.

The third vertebra is alſo called axis by ſome, though it has nothing to warrant ſuch a name; for there is nothing particular to be obſerved in this, or any of the ſucceeding vertebræ of the neck, more than has already been taken notice of them in general.

The dorſum, or back, has twelve vertebræ, of which we may remark, in general, that they are of a middle ſize between thoſe of the neck, and thoſe of the loins: their ſpinoſe apophyſes are alſo very long, and, except in the two laſt, very much inclinated: the cartilages between the bodies of theſe, are ſmaller than thoſe of the neck: the two tranſverſe apophyſes are thick, and have a depreſſion in them for the articulation with the ribs. The firſt vertebra of the back is called the axillary, or eminent vertebra; and to it is joined the upper rib. See the article RIBS.

The vertebræ of the loins are five, of which we may obſerve, in general, that their bodies, and alſo the intervening cartilages, are very thick: the tranſverſe apophyſes very long, but ſmaller than thoſe of the back: the ſpinoſe apophyſes are thick, ſtrait, and ſet farther aſunder than in the others, to give way to a laxer motion in this part.

Some have given particular names to the vertebræ of the back and loins; but this is not neceſſary, as they are ſufficiently diſtinguiſhed by numbering them. For the luxations, fractures, and other injuries of the vertebræ, ſee the articles LUXATION, &c.

VERTEX, in anatomy, denotes the crown of the head, or the uppermoſt part ſituated between the ſinciput and the occiput.

Hence vertex is alſo uſed, figuratively, for the top of other things: thus the vertex of a cone, pyramid, &c. is the top of any one of theſe figures. See CONE, &c.

VERTEX *of a Glaſs*, in optics, the ſame with the pole thereof.

VERTEX, in aſtronomy, is alſo uſed for the point of heaven perpendicularly over our heads, properly called the zenith. See ZENITH.

Path of the VERTEX, the circle deſcribed by the vertical point during one revolution of the earth about its axis.

VERTICAL CIRCLE, in aſtronomy, a great circle of the ſphere, paſſing through the zenith and nadir, and cutting the horizon at right-angles: it is otherwiſe called azimuth. See AZIMUTH.

Prime VERTICAL, is that vertical circle or azimuth which paſſes through the poles of the meridian; or which is perpendicular to the meridian, and paſſes through the equinoxial points.

VERTICAL *of the Sun*, is the vertical which paſſes through the center of the ſun at any moment of time.

VERTICAL PLANE, in perſpective, is a plane perpendicular to the geometrical plane, paſſing thro' the eye, and cutting the perſpective plane at right-angles.

VERTICAL PLANE, in conics, is a plane paſſing through the vertex of the cone, and parallel to any conic ſection. See the article PLANE.

VERTICAL LINE, in conics, is a right line drawn on the vertical plane, and paſſing through the vertex of the cones.

VERTICAL DIAL, is a ſun-dial drawn on the plane of a vertical circle, or perpendicular to the horizon.

VERTICAL POINT, in aſtronomy, the ſame with vertex or zenith.

VERTICILLATE PLANTS, are ſuch as produce their flowers round the joints of the ſtalks in whorles; theſe are the ſame with the labiated or lipped flowers. All the plants producing flowers in this manner, belong to the didynamia claſs of Linnæus's ſyſtem, and of the order gymnoſpermia: ſuch are hyſſop, mint, thyme, &c. See the articles DIDYNAMIA, GYMNOSPERMIA, &c.

VERTICITY, is that property of the loadſtone, whereby it turns, or directs itſelf to ſome peculiar point. See MAGNET.

VERTIGO, in medicine, a diſeaſe in which the head ſeems to turn round.

This, according to Dr. Willis, is a diſorder in which viſible objects ſeem continually to turn round, whilſt the patients are affected with a perturbation or confuſion of the animal ſpirits in the brain,

which hinders their influx into the nerves. Hence it is, that the visive and locomotive faculties often fail to such a degree, that the patient is ready to drop down, and complains of darkness.

Etmuller divides it into three kinds; the first of which is a simple vertigo, in which there is only a transient and short-continued gyration of objects. The second is a dark vertigo, or scotomia, when the eyes are darkened, or so affected, as if several colours were before them. The third is the vertigo caduca, in which the patient presently falls down.

A vertigo may be produced by every cause which can distend, press, or contract the arteries; such as sudden fear, surprize, ebriety, and voracity, by which the regular influx and reflux of the animal spirits into the optic nerves and retina are prevented. Sometimes, also, it may be produced by an acid, or any peccant humour, lodged in the stomach, and vellicating its nerves, which communicate with the retini; for which reason the hypochondriac and hysteric passions may produce a vertigo.

With respect to the cure, the regimen in general, ought to be the same with that in the apoplexy or epilepsy. See APOPLEXY and EPILEPSY.

If the patient is plethoric, a due quantity of blood is to be taken away; and if a nausea, loss of appetite, or any other disorder of the stomach remain, an emetic is to be prescribed; then cathartics and specifics are to be ordered.

According to Mayerne, calamus aromaticus, in whatever form, is good in a vertigo, and esteemed a secret for that disorder. The same author informs us, that a German physician cured a great many of vertigoes, by pills made of sugar of lead and Cyprus turpentine; four or five grains of which were to be taken for a dose, and their use persisted in for some days.

Glisson, as Bates informs us, after all other medicines had failed, was cured of a severe vertigo, of three weeks continuance, by shaving his head, and applying to it a plaster of the flowers of sulphur and whites of eggs. Some order a caustic, or a seton, to be applied to the back part of the neck; a cautery to the bregma, and Bates's epileptic electuary, or Fuller's Peruvian epileptic electuary, to be used internally.

Willis informs us, that after he had in vain tried all other medicines, he, with success, prescribed the following powder: Take of the powder of the roots of male piony, two ounces; of the flowers of male piony, one ounce; of peacocks dung, of the whitest kind, half a pound; and of white sugar, two ounces: reduce to a powder, the dose of which is to be about the quantity of a spoonful twice a day, drinking after it a draught of a decoction of sage and rosemary, impregnated with coffee.

Heister orders camphorated spirit of wine alone, or mixed with spirit of hartshorn, to be applied to the top of the head and temples. And when the disorder proceeds from crudities in the stomach, he advises to prepare and dissolve them by neutral salts, that they may be afterwards evacuated by an emetic, or purge. After this, the patient should use stomachics and cephalics; as also a moderate quantity of wine at meals, which should be sparing. Pyrmont-water is also said to be excellent in this case.

VERVIAN, *Verbena*, in botany. See the article VERBENA.

VERVIAN-MALLOW, in botany. See the article MALVA.

VERU-*Montanum*, in anatomy, a kind of little valve, in the place wherein the ejaculatory ducts enter the urethra.

Its use is to prevent the urine, in passing the urethra, from getting in at these ducts, and so mixing with the semen.

VERY LORD and VERY TENANT, are those that are immediate lord and tenant to one another.

VESICA, in anatomy, a bladder, a membranous or skinny part in which any humour is contained. See BLADDER.

VESICATORY, *Vesicatorium*, an external medicine, serving to raise a blister; whence, also, it is itself, though improperly, called a blister.

Vesicatories are unguents, cataplasms, or plasters, made of sharp irritating medicines, which have a faculty of drawing the humours from within, outwards, inflaming and ulcerating the skin, and raising vesicæ, or bladders, whence their denomination vesicatory.

We have vesicatories made of cantharides, euphorbium, figs, sublimate of mercury, lapis infernalis, mustard, anacardium, squills, briony, vinegar, pepper, leaven, which are incorporated and made up with honey, gums, resins, &c. to bring them to the consistence required.

VESICULA, vesicle, a diminutive of vesica, signifying a little bladder.

The lungs consist of vesiculæ, or lobules of vesiculæ, admitting air from the bronchia; and not only air, but also dust, &c.

There are several other parts in the body which bear this appellation; as the vesicula fellis, or gall-bladder, vesiculæ seminales, &c.

VESPA, the wasp, in zoology. See the article WASP.

VESPER, or HESPER, in astronomy. See the article HESPER.

VESPERS, in the church of Rome, denote the afternoon service, answering, in some measure, to the evening prayers of the church of England.

VESPERTILIO, the bat, in zoology, a genus of quadrupeds of the order of the feræ, the characters of which are these: the fore-teeth in the upper jaw are six in number, acute, and distant from each other;

other; the fore-teeth of the lower jaw are alſo ſix, and acute, but contiguous: the canine teeth are two both above and below, on each ſide: the feet have each five toes; and the fore feet have the toes connected by a membrane, and expanded into a ſort of wings, whereby it flies; whence this animal has been generally, but with the utmoſt impropriety, ranged among the birds.

The common bat is about the bigneſs of a mouſe, and very much reſembles it in ſhape and colour. There are ſeveral other ſpecies of this creature, ſome with, and others without, a tail.

VESPERTILIONUM ALÆ, bats-wings, in anatomy, a name given to the two broad ligaments which connect the bottom of the uterus to the bones of the ilium. See the article UTERUS.

VESSEL, *Vas*, denotes in general any thing for holding liquors; ſuch are our domeſtic cups, pots, &c. as alſo the retorts, matraſſes, crucibles, &c. of the chemiſts.

In anatomy, all the parts which contain or convey a fluid, are called veſſels; as the veins, arteries, lymphatics, &c.

Some alſo extend the word veſſel to the nerves, as ſuppoſing them the conduits of the animal ſpirits.

VESSEL, in navigation, a general name for all ſorts of ſhips. See the article SHIP.

VESTALIA, in Roman antiquity, a feſtival celebrated in honour of the goddeſs Veſta, on the fifth of the ides of June; that is, on the ninth of that month.

VESTALS, *Veſtales*, among the ancient Romans, were prieſteſſes of the goddeſs Veſta, and had the perpetual fire committed to their charge: they were at firſt only four in number, but afterwards increaſed to ſix; and it does not appear, that their number ever exceeded ſix, among whom one was ſuperior to the reſt, and called *Veſtalis maxima*.

The veſtals were choſen from ſix to ten years of age, and obliged to ſtrict continency for thirty years; the firſt ten of which were employed in learning the ceremonies of religion, the next ten in the performance of them, and the ten laſt in teaching them to the younger veſtals.

The habit of the veſtals conſiſted of an head-dreſs, called infula, which ſat cloſe to their heads, and from whence hung certain laces called vittæ; a kind of ſurplice made of white linen, and over it a purple mantle with a long train to it.

VESTIBLE, *Veſtibulum*, in architecture, a kind of entrance into a large building; being an open place before the hall, or at the bottom of the ſtair-caſe. Veſtibles, intended for magnificence, are uſually between the court and the garden.

The Romans had veſtibles at the entrance of their houſes, for ſheltering thoſe perſons who were obliged to ſtand at the door; and we have now veſtibles of a like kind in many old churches, houſes, &c. uſually called porches.

The term veſtible is ſometimes alſo uſed for a little anti-chamber, before the entrance of an ordinary apartment.

VESTIBLE *of the Ear*, in anatomy, a cavity forming the middle part of the labyrinth of the ear.

VESTIGIA, a Latin term frequently uſed, by Engliſh writers, for the traces or footſteps which any thing has left behind it.

VESTRY, a place adjoining to a church, where the veſtments of the miniſter are kept; and alſo a meeting at ſuch place, conſiſting of the miniſter, church-wardens, and chief men of moſt pariſhes, who make a pariſh veſtry or meeting. By cuſtom there are ſelect veſtries, being a certain number of perſons choſen to have the government of the pariſh, make rates, and take the accounts of church-wardens, &c. And it is here to be obſerved, that when any rates are made, the pariſhioners muſt have notice of a veſtry held for that purpoſe; in which caſe all that are abſent ſhall be included by a majority of the pariſhioners preſent, who in conſtruction of law are the whole pariſh. Veſtries of pariſhes are to be conſulted by pariſh officers; and if a pariſhioner, who has a right to be preſent and vote at a veſtry, be ſhut out of the veſtry-room, action of the caſe lies.

VETCH, *Vicia*, in botany. See the article VICIA.

VETCH alſo makes part of the Engliſh names of ſeveral other plants, as bitter vetch, chickling vetch, horſe-ſhoe vetch, milk vetch, &c. See the articles ERVUM, OROBUS, LATHYRUS.

VETERAN, among the ancient Romans, an appellation given to a ſoldier who was grown old in the ſervice, or had made a certain number of campaigns.

VIA-LACTEA, in aſtronomy, the milky-way, or galaxy. See GALAXY.

VIA-SOLIS, *the Sun's Way*, in aſtronomy, is uſed, among ſome aſtronomers, for the ecliptic line, ſo called, becauſe the ſun never goes out of it. See ECLIPTIC.

VIÆ PRIMÆ, firſt paſſages, among phyſicians, are the œſophagus, ſtomach, and guts; including the whole length of the alimentary duct, or canal, from the mouth to the ſphincter ani.

VIALES, in mythology, a name given among the Romans to the gods who had the care and guard of the road and highways.

The dii viales, according to Labeo, were of the number of thoſe gods called dii animales, who were ſuppoſed to be the ſouls of men changed into gods; and were of two kinds, viz. the viales and penates.

VIATICUM, in the church of Rome, an appellation given to the euchariſt, when adminiſtered to perſons at the point of death.

VIBEX,

VIBEX, is ſometimes uſed, by phyſicians, for a black and blue ſpot in the ſkin, occaſioned by an afflux or extravaſation of the blood.

VIBRATION, in mechanics, a regular, reciprocal motion of a body, as a pendulum, &c. which being freely ſuſpended, ſwings, or oſcillates, firſt this way, then that.

VIBRATION is alſo uſed, in phyſics, for divers other regular alternate motions: thus ſenſation is ſuppoſed to be performed, by means of the vibratory motion of the nerves, begun by external objects, and propagated to the brain.

VIBURNUM, in botany, a genus of umbeliferous plants, whoſe flower is monopetalous, and campanulated, with the limb divided into five obtuſe reflexed ſegments; the ſtamina are five ſubulated filaments, topped with roundiſh antheræ; the fruit is a roundiſh unilocular berry, containing one oſſeous roundiſh ſeed.

This genus comprehends the lauruſtinus, the opulus, or water-elder, the Virginian hawthorn, the guilder-roſe, and the common viburnum or wayfaring tree. See LAURUSTINUS, &c.

VICAR, *Vicarius*, a perſon appointed, as deputy to another, to perform his functions in his abſence, and under his authority.

VICAR, in the canon law, denotes a prieſt of a pariſh, the predial tithes whereof are impropriated or appropriated; that is, belong either to a chapter, religious houſe, &c. or to a layman, who receives them, and only allows the vicar the ſmall tithes or a convenient ſalary, anciently called portio congrua.

VICAR-GENERAL, was a title given by king Henry VIII. to Thomas Cromwell, earl of Eſſex, with full power to overſee the clergy, and regulate all matters relating to church affairs.

VICE, *Vitium*, in ethics, is ordinarily defined an elective habit, deviating either in exceſs or defect from the juſt medium wherein virtue is placed. See the articles HABIT, VIRTUE, &c.

VICE, in ſmithery, and other arts employed in metals, is a machine, or inſtrument, ſerving to hold faſt any thing they are at work upon, whether it is to be filed, bent, rivetted, &c. To file ſquare, it is abſolutely neceſſary that the vice be placed perpendicular, with its chaps parallel to the work-bench.

Hand-VICE, is a ſmall kind of vice ſerving to hold the leſſer works in, that require often turning about.

Of theſe there are two kinds, the broad-chapped hand-vice, which is that commonly uſed; and the ſquare noſed hand-vice, ſeldom uſed but for filing ſmall round work.

VICE, is alſo a machine uſed by the glaziers, to turn or draw lead into flat rods, with grooves on each ſide to receive the edges of the glaſs.

VICE, is alſo uſed in the compoſition of divers words, to denote the relation of ſomething that comes inſtead, or in the place, of another; as vice-admiral, vice-chamberlain, vice-chancellor, vice-preſident, &c. are officers who take place in the abſence of admirals, &c.

VICE-ROY, a governor of a kingdom, who commands in the name and ſtead of a king, with full and ſovereign authority.

VICE VERSA, a Latin phraſe, importing, on the contrary; thus, as the ſun mounts higher and higher above the horizon, the ſhadows of things decreaſe; and *vice verſa*, as he deſcends lower, they increaſe.

VICIA, vetch, in botany, a genus of plants, whoſe flower is papilionaceous; the fruit is a long bivalve coriaceous pod, containing ſeveral roundiſh ſeeds.

To this genus belong the common tare. See the article TARE.

VICISSITUDE, the regular ſucceſſion of one thing after another; as the viciſſitude of day and night, of the ſeaſons, &c.

VICOUNT, in old law-books, ſignifies the ſame with ſheriff. See SHERIFF.

VICOUNT, or VISCOUNT, is alſo a degree of nobility next below a count, or earl, and above a baron. See EARL, &c.

VICOUNTIEL, in law-books, ſomething belonging to, or falling within the ſheriff's juriſdiction: thus writs vicountiels are writs triable in the ſheriff's court; and there are certain vicountiel rents, whereof the ſheriff keeps a particular roll, that uſually comes under the title of firma comitatus.

Alſo vicountiel juriſdiction, is that which belongs to officers of a county; as ſheriff, coroner, &c. See SHERIFF.

VICTIM, *Victima*, denotes a bloody ſacrifice offered to ſome deity, of a living creature, as a man or beaſt, which is ſlain to appeaſe his wrath, or obtain ſome favour.

VICTIMARIUS, in antiquity, a miniſter or ſervant of the prieſt, whoſe office was to bind the victims, and prepare the water, knife, and other things neceſſary for the ſacrifice.

To the victimarii it alſo belonged to knock down and kill the victims, in order to which they ſtood cloſe by the altar naked to the waiſt, but crowned with laurel, and holding a hatchet or knife up, aſked the prieſt leave to ſtrike; ſaying, *agone?* whence they were called agones and cultellarii. See AGON.

When the victim was killed, they opened it, and after viewing the entrails, took them away, waſhed the carcaſe, ſprinkled the flour on it, &c. The ſame victimarii lighted the fire wherein books were condemned to be burnt.

VICTUALS, ſignifies any kind of ſuſtenance,

or things neceſſary to live upon, as meat and proviſions; which are to be ſold at a reaſonable price, aſſeſſed by juſtices, &c. on pain of forfeiting double the value. By the cuſtom of ſome manors, they chooſe yearly ſurveyors of victuals.

VI ET ARMIS, in law, are words made uſe of in indictments and actions of treſpaſs, to ſhew the violent commiſſion of any treſpaſs or crime; but in an appeal of death, or where a perſon is killed with a weapon, theſe words are not held neceſſary, becauſe the violence is implied.

VIEW, in law, ſignifies the particular act of viewers; as where a real action is brought, and the tenant does not certainly know what land it is the defendant requires; then he may pray that the jury may view the ſame, that is to ſay, ſee the land that is claimed. But it is held, that in all caſes of viewing, the thing in controverſy is only to be ſhewn to the jurors, and no evidence can be given relating to it on either ſide: and here if waſte be alledged to be done, the view of the houſe generally is ſufficient.

VIEW *of frank Pledge*, is the office which the ſheriff in his county-court, the ſteward in the leet, or the bailiff in his hundred, performs in looking to the king's peace, and ſee that every man be in ſome pledge.

VIGILS, in church-hiſtory, are the faſts appointed before certain feſtivals, in order to prepare the mind for a due obſervation of the enſuing ſolemnity.

VIGINTIVIRATE, a tribunal or court among the ancient Romans, firſt eſtabliſhed by Cæſar, conſiſting of twenty members, three of whom judged of all criminal matters; three others had the inſpection of the coins; four others had the inſpection of the ſtreets of Rome; and the reſt were judges of civil affairs.

VILLAGE, an aſſemblage of houſes, inhabited chiefly by peaſants and farmers, and having no market, whereby it is diſtinguiſhed from a town.

Fleta tells us, that the difference made between a manſion, a village, and a manor, is this, viz. a manſion may conſiſt of one or more houſes, but muſt be of one dwelling place, and none near it; for if any other houſes are contiguous, it is then a village; and a manor conſiſts of ſeveral villages, or of one alone.

Where in legal proceedings a place is named generally, it ſhall be taken for a vill, becauſe as to civil purpoſes the kingdom was firſt divided into vills; yet it has been held, that a vill and a pariſh ſhall be intended the ſame.

VILLAIN, or VILLEIN, *Villanus*, in our ancient cuſtoms, denotes a man of ſervile and baſe condition, viz. a bondman or ſervant: and there were anciently two ſorts of bondmen or villains in England; the one termed a villain in groſs, who was immediately bound to the perſon of his lord and his heirs; the other a villain regardant to a manor, he being bound to his lord as a member belonging and annexed to the manor whereof the lord was owner; and he was properly a pure villain, of whom the lord took redemption to marry his daughter, and to make him free; and whom the lord might put out of his lands and tenements, goods and chattels at his will, and beat and chaſtiſe, but not maim him.

VILLENAGE, a kind of ancient tenure, whereby the tenant was bound to do ſuch ſervices as the lord commanded, or ſuch as were fit for villains or bondmen to perform.

VILLI, among botaniſts, a kind of down like coarſe hair, or the grain or ſhag of pluſh, with which ſome trees abound.

VILLOSE, or VILLOUS, ſomething abounding with villi, or fibres like coarſe hairs: ſuch is one of the coats of the ſtomach. See STOMACH.

VINCA, periwinkle, in botany, a genus of plants, whoſe flower is monopetalous and ſaucer-ſhaped, with an horizontal limb divided into five obtuſe ſegments; the ſtamina conſiſts of five very ſhort inflexed filaments, topped with erect, obtuſe, membranaceous antheræ; the fruit conſiſts of two erect cylindric huſks opening longitudinally with one valve, and contains a number of oblong, cylindric, and furrowed ſeeds.

A ſpecies of this genus, which grows naturally on the iſland of Madagaſcar, is exceeding beautiful, and continues in full bloſſom all the ſummer, but being tender, requires a ſtove in this climate for its preſervation.

This kind is eaſily propagated by cuttings in any of the ſummer months.

The common periwinkle grows wild among hedges, &c. in many parts of England; it has a fibrous root, with ſlender trailing ſtalks, furniſhed with oblong, ever-green leaves; it begins to flower in the ſpring, and continues a ſucceſſion of bloſſoms for a long time.

It is ſaid to be vulnerary, aſtringent, and febrifuge; and is given to abate all kinds of bleeding: the freſh leaves applied to the ſwellings of the king's evil, mixed with lint, are accounted by ſome an excellent remedy to diſcuſs and diſſolve them.

VINCULUM, in mathematics, a character in form of a line, or ſtroke, drawn over a factor, diviſor, or dividend, when compounded of ſeveral letters or quantities, to connect them, and ſhew they are to be multiplied, or divided, &c. together by the other term. Thus $d \times \overline{a + b - c}$ ſhews that d is to be multiplied into $a + b - c$.

VINDEMIATING, the gathering of the grapes, or other ripe fruits, as the apples, pears, cherries, &c.

VINDEMIATRIX, or VINDEMIATOR, a fixed ſtar of the third magnitude in the conſtellation Virgo. See VIRGO.

VINDICATION, or claiming, in the civil law,

an action arising from the property a person has in any thing; or a permission to take or seize a thing, as one's own, out of the hands of a person, whom the law has doomed not to be the true proprietor.

VINE, *Vitis*, in botany, a genus of plants, whose flowers are produced in bunches; the corolla of each consists of five small rude petals which drop off, and five subulated stamina; the fruit is a large, oval, or roundish berry, with one cell, containing five osseous turbinato-cordated seeds.

Vines, so famous for the fruit and generous liquors they afford, are of various sorts, the principal of which are the July grape, the black sweet-water, the white sweet-water, the royal muscadine, the black cluster, the Burgundy, the white muscadine, the black frontiniac, the white frontiniac, the red frontiniac, the red and black Hamburgh, and the St. Peter; these, with a few others, are the sorts most fit to be cultivated in this country, and in warm summers will ripen their fruit very well, particularly the seven first mentioned; they are all propagated by layers or cuttings; if from cuttings, they should be chosen from the last summer's shoots, well ripened, leaving a knob of the former year's wood to it; these may be taken off the mother plant either in autumn or spring, the autumn is the best season for this operation; their length may be about a foot in the ground, leaving two eyes or buds above. The best season to prune vines is when the leaves turn yellow and begin to drop off; the method to to perform this, is to shorten the bearing shoots, which are those produced the last summer, to four or five buds, but if weak to three, these are sufficient; for each bud will produce a shoot which generally has two bunches of grapes, so that from each of those there may be expected six or eight bunches; these shoots should not be less than a foot distance, and if of the large kinds and vigorous, not less than a foot and a half asunder, the remaining wood to be cut away: in the training of vines against a wall, some direct them horizontally, and others perpendicular; it is not easy to determine which is best; if the wall is low, it may be proper to train them horizontally, but if high, the perpendicular direction should be preferred; for the vigorous nature of a vine is such, that though the branches are led up a wall eighteen or twenty feet high, yet the fruit at the top hath sufficient quantity of juices for its nourishment, and is not inferior to those bunches which grow within three or four feet of the ground.

In pruning a vine, observe to make the cut just above the eye, sloping it backward from it, and where it is convenient, to make choice of a fore-right bud to cut from, so that the slope will be next the wall, by which means the wound will not be so much exposed to the weather or sight.

For the management of vines in summer, observe that no kind of branch be suffered to grow as is not fit and necessary either for wood or fruit; therefore in the beginning of May, all small weak shoots should be pulled off, these will put out in many places, and, if not displaced, rob the fruit of its nourishment: as the reserved shoots advance, they should be nailed up regularly; this practice should be done as often as it is necessary during the whole summer season, picking off all dangling shoots and lateral branches as they are produced. In July, the extremities of the fruit-bearing branches may be pinched off, this will help to strengthen and enlarge the bunches of fruit; but it is an ill practice to divest the branches of their leaves in order to admit the rays of the sun to the fruit; for being so suddenly exposed thereto, their skins will be so tough, as to prevent not only their growth but likewise their ripening.

It is absolutely necessary that strict regard be had to the summer management of vines, for on this depends the next year's success; so that a sufficient number of vigorous shoots be laid in to succeed such old ones as may be cut out in the autumn; and although vines will produce grapes from knots of old wood, yet they are never so good or large as those which grow on young vigorous branches.

If wines are planted against espaliers, the fruit (particularly the early sorts) will ripen very well in favourable seasons, especially if planted in a proper soil and good aspect, but such late grapes as the frontiniac, &c. our summers rarely prove long or hot enough to bring them to the perfection they require, therefore it is necessary they should be under glass all the summer, whereby they will be completely ripened by September.

Before grapes begin to ripen, they should be carefully guarded against birds, wasps, and other insects, otherwise they will be destroyed in a short time; to prevent which, the vines should be carefully covered with nets, so as to exclude the birds, who make great havock with the grapes by breaking their skins; and if there are a few twigs covered with birdlime placed here and there on the outside of the nets, it will be of service, because the birds are often so bold as to attempt to break the nets to get at the grapes, which if they attempt, they may be so entangled on these twigs as not to get loose; and whenever that happens, they should not be disengaged, but suffered to remain, to deter their companions from offering such violences.

As to wasps, the best method is to hang up some phials about half filled with sugared or treacled water, into which they will get, without being able to return; these phials should be replenished every three or four days with fresh liquor, by which means the damage will be prevented.

The buds of the vine, as well as the leaves, are astringent, and they were used by the ancients to cure the looseness; some people in France now give the powder of the green leaves, dried in the shade,

to a dram, for the ſame purpoſe. The uſe of the fruit is univerſally known for eating or making wine. See the article WINE.

When the fruit is green, it produces the liquor which is properly called verjuice; and in this ſtate it is a little aſtringent, and ſerves to abate the heat of the ſtomach and to ſtop a bilious looſeneſs, as well as to recover the appetite; it is made uſe of in France in the ſame manner as our common verjuice made with crab-apples.

When grapes are dried in the ſun or in an oven for keeping, they are called raiſins of the ſun. See the article RAISIN.

VINEGAR, *Acetum*, an acid penetrating liquor, prepared from wine, cyder, beer, &c. of conſiderable uſe both as a medicine and ſauce.

The proceſs of turning vegetable matters to vinegar, is thus delivered by Dr. Shaw: take the ſkins of raiſins, after they have been uſed in making wine; and pour three or four times their own quantity of boiling water upon them, ſo as to make a thin aqueous mixture. Then ſet the containing caſk, looſely covered, in a warmer place than is uſed for vinous fermentation; and the liquor in a few weeks time will become a clear and ſound vinegar; which being drawn off from its ſediment, and preſerved in another caſk, well ſtopped down, will continue perfect, and fit for uſe.

This experiment ſhews us a cheap and ready way of making vinegar from refuſe materials; ſuch as the huſks of grapes, decayed raiſins, the lees of wine, grounds of ale, beer, &c. which are frequently thrown away as uſeleſs. Thus, in many wine countries, the marc, rape, or dry preſſing of grapes, are thrown in heaps, and ſuffered to putrify unregarded, though capable of affording as good vinegar as the wine itſelf. In ſome places they bury copper-plates in theſe huſks, in order to make verdigreaſe; but this practice ſeems chiefly confined to the ſouthern parts of France. Our preſent experiment ſhews us how to convert them to another uſe; and the direction extends to all the matters that have once undergone, or are fit to undergo, a vinous fermentation, for that all ſuch matters will afford vinegar. Thus all our ſummer-fruits in England, even black-berries; all the refuſe waſhings of a ſugar-houſe, cyder-preſſings, or the like, will make vinegar, by means of water, the open air, and warmth.

The whole proceſs, whereby this change is effected, deſerves to be attentively conſidered; and, firſt, the liquor to be thus changed, being kept warmer than in vinous fermentation, it begins, in a few days, to grow thick or turbid; and without throwing up bubbles, or making any conſiderable tumult, as happens in vinous fermentation, depoſits a copious ſediment.

The effect of this ſeparation begins to appear, firſt, on the ſurface of the liquor, which gathers a white ſkin, that daily increaſes in thickneſs, till at length it becomes like leather; and now, if continued longer in this ſtate, the ſkin turns blue, or green, and would at laſt grow ſolid, and putrify: therefore, in keeping down this ſkin as it grows, and thruſting it gently down to the bottom of the veſſel, conſiſts much of the art of vinegar making, eſpecially from malt. For the difference between vinous and acetous fermentation, ſee the article FERMENTATION.

Method of making Cyder-VINEGAR. The cyder (the meaneſt of which will ſerve the purpoſe) is firſt to be drawn off fine into another veſſel, and a quantity of the muſt, or pouz of apples, to be added: the whole is ſet in the ſun, if there be a conveniency for the purpoſe; and, at a week or nine days end, it may be drawn off. See CYDER.

Method of making Beer-VINEGAR. Take a middling ſort of beer, indifferently well hopped; into which, when it has worked well, and is grown fine, put ſome rape, or huſks of grapes, uſually brought home for that purpoſe: maſh them together in a tub; then, letting the rape ſettle, draw off the liquid part, put it into a caſk, and ſet it in the ſun as hot as may be (the bung being only covered with a tile, or ſlate-ſtone) and in about thirty or forty days, it will become a good vinegar, and may paſs in uſe as well as that made of wine, if it be refined, and kept from turning muſty.

Or thus: to every gallon of ſpring-water, add three pounds of Malaga-raiſins; which put into an earthen jar, and place them where they may have the hotteſt ſun from May till Michaelmas; then preſſing all well, tun the liquor up in a very ſtrong iron-hooped veſſel, to prevent its burſting: it will appear very thick and muddy, when newly preſſed; but will refine in the veſſel, and be as clear as wine.

Thus let it remain untouched for three months, before it be drawn off, and it will prove excellent vinegar.

Method of making Wine-VINEGAR. Any ſort of vinous liquor, being mixed with its own fæces, flowers, or ferment, and its tartar, firſt reduced to powder; or elſe with the acid and auſtere ſtalks of the vegetable from whence the wine was obtained, which hold a large proportion of tartar: and the whole being kept frequently ſtirring in a veſſel which has formerly held vinegar, or ſet in a warm place full of the ſteams of the ſame, will begin to ferment a-new, conceive heat, grow ſour by degrees, and ſoon turn into vinegar.

The remote ſubjects of acetous fermentation are the ſame with thoſe of vinous; but the immediate ſubjects of it are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine: for it is abſolutely impoſſible

ſible to make vinegar of muſt, the crude juice of grapes, or other ripe fruits, without the previous aſſiſtance of vinous fermentation.

The proper ferments for this operation, whereby vinegar is prepared, are, 1. The fæces of all acid wines. 2. The leys of vinegar. 3. Pulveriſed tartar; eſpecially that of Rheniſh wine, or the cream, or cryſtals thereof. 4. Vinegar itſelf. 5. A wooden veſſel well drenched with vinegar, or one that has been long employed to contain it. 6. Wine that has often been mixed with its own fæces. 7. The twigs of vines, and the ſtalks of grapes, currants, cherries, and other vegetables of an acid auſtere taſte. 8. Bakers leaven, after it is turned acid. 9. All manner of ferments, compounded of thoſe already mentioned.

The French uſe a method of making vinegar different from that above deſcribed. They take two large oaken veſſels, the larger the better, open at top; in each whereof they place a wooden grate, within a foot of the bottom: upon theſe grates they firſt lay twigs, or cuttings of vines, and afterwards the ſtalks of the bunches, without the grapes themſelves, or their ſtones; till the whole pile reaches within a foot of the brim of the veſſels: then they fill one of theſe veſſels with wine to the very top, and half fill the other; and with liquor drawn out of the full veſſel, fill up that which was only half full before; daily repeating the ſame operation, and pouring the liquor back from one veſſel into another; ſo that each of them is full, and half full, by turns.

When this proceſs has been continued for two or three days, a degree of heat will ariſe in the veſſel, which is then but half full, and increaſe for ſeveral days ſucceſſively, without any appearance of the like in the veſſel which happens to be full, during thoſe days; the liquor whereof will ſtill remain cool: and as ſoon as the heat ceaſes in the veſſel that is half full, the vinegar is prepared: which, in the ſummer, happens on the fourteenth or fifteenth day from the beginning; but in the winter, the fermentation proceeds much ſlower: ſo that they are obliged to forward it by artificial warmth, or the uſe of ſtoves.

When the weather is exceeding hot, the liquor ought to be poured off from the full veſſel into the other twice a-day: otherwiſe, the liquor will be overheated, and the fermentation prove too ſtrong; whence the ſpirituous parts will fly away, and leave a vapid wine, inſtead of a vinegar, behind.

The full veſſel is always to be left open at the top, but the mouth of the other muſt be cloſed with a cover of wood, in order the better to keep down and fix the ſpirit in the body of the liquor; otherwiſe, it might eaſily fly off in the heat of fermentation. The veſſel that is only half full ſeems to grow hot, rather than the other, becauſe it contains a much greater quantity of the vine-twigs and ſtalks, than that, in proportion to the liquor; above which the pile, riſing to a conſiderable height, conceives heat the more, and ſo conveys it to the wine below.

Vinegar is a medicine of excellent uſe in all kinds of inflammatory and putrid diſorders, either internal or external: in ardent bilious fevers, peſtilential and other malignant diſtempers, it is recommended by Boerhaave as one of the moſt certain ſudorifics. Weakneſs, fainting, vomiting, hyſterical and hypochondriacal complaints have alſo been frequently relieved by vinegar applied to the mouth and noſe, or received into the ſtomach. Diſtilled vinegar has the ſame virtues, only in a ſtronger degree.

There are alſo medicated vinegars, as vinegar of antimony, of elder, litharge, roſes, ſquills, treacle, &c. which derive their chief virtues from the vinegar.

VINEYARD, *Vinetum*, a plantation of vines without the aſſiſtance of walls, &c. See VINE.

The beſt ſituation for a vineyard, is upon an elevation inclining to the ſouth, with a ſmall gradual deſcent; and the beſt ſoil for a vineyard, in England, is ſuch whoſe ſurface is a light ſandy loam, and not more than a foot and a half, or two feet, above gravel or chalk, either of which bottoms are equally good for vines; but clay or ſtrong loams are not ſo proper for theſe plants, as the grapes produced on ſuch lands are later in ripening, fuller of moiſture, and conſequently their juice not mature, nor well digeſted; therefore, very improper to make wine with.

The ſoil and ſituation being choſen, preparations previous to planting ſhould be made; in doing which, the following method ſhould be obſerved: In the ſpring, it ſhould be ploughed as deep as the ſurface will admit, turning the ſward into the bottom of each furrow; then it ſhould be well harrowed to break the clods, and cleanſe it from the roots of noxious weeds: and after this, it muſt be kept often plowed and harrowed, for at leaſt a year, to render the ſurface light; and hereby it will become more fertile, by imbibing the nitrous particles of the air.

In March the ground ſhould be well ploughed again, and after having made the ſurface pretty even, the rows ſhould be marked out from ſouth-eaſt to north-weſt, at the diſtance of ten feet from each other, and theſe rows ſhould be croſſed again at five or ſix feet diſtance, which will mark out the exact places where each plant ſhould ſtand, ſo that the vines will be ten feet row from row, and five or ſix feet aſunder in the rows, nearer than which they ought never to be planted; for it has always been obſerved that the fineſt wines are produced from the fruit of thoſe plants which have had the greateſt diſtance allowed them.

The next thing to be conſidered is the choice of proper ſorts of vines: thoſe which produce the beſt wines are to be choſen, if cuttings are approved of, (which

(which are reckoned better than rooted plants) then make a hole about a foot deep in each croſs mark; and in each hole ſhould be placed one ſtrong cutting, a little ſloping; the hole ſhould afterwards be filled up with earth, preſſing it with the feet gently to the cutting, and raiſing a little hill of about three inches to each, ſo as juſt to cover the eye or bud, which will prevent the ſun and wind from drying the cuttings, and this upper eye only will ſhoot, the under ones moſtly will puſh out roots, ſo that this ſhoot will be very ſtrong and vigorous.

After they are thus planted, they will require no other care till they ſhoot, except to keep the ground clear from weeds.

When the cuttings put forth, there ſhould be a ſmall ſtick, about three feet long, ſtuck down by each, to which the ſhoot ſhould be faſtened; and as they advance, the faſtening ſhould be renewed, and all ſmall lateral ſhoots diſplaced, as they happen to be produced. In autumn, when the leaves decay, each ſhoot ſhould be cut down to two eyes, and the earth drawn up to them for a defence againſt the froſts. In March, the ground ſhould be dug between the vines; and, in May, two ſtakes ſhould be fixed to the ſide of each, rather ſtouter than thoſe uſed the preceding year, diſplacing all other ſmall and lateral branches. In autumn, they are again to be pruned to three eyes; and in the ſucceeding year many of them will bear fruit.

The ground ſhould be dug every year in the ſpring ſeaſon, taking care, in the operation, not to cut or wound any of the main roots with the ſpade; but they ſhould be cleared of all ſuckers which may happen to ariſe; and every autumn, the vines ſhould be pruned to three or four eyes, and not to have above three ſhoots to each plant, which ſhould be annually managed as directed under the article VINE; which ſee.

When the fruit is ripe, if the ſtalks of the bunches are cut half way through, a fortnight before they are gathered, it will cauſe the juice to be much better; as there will not be near ſo great a quantity of nouriſhment enter the fruit, whereby the watery particles will have time to evaporate, and the juice will be better digeſted: this is practiſed by the moſt curious vignerons in the ſouth of France, where they make excellent wine.

As the beauty of vineyards ariſes from the regular diſpoſition of the branches of the vines, great care ſhould be taken in their management to train them regularly, and to provide every year for new wood to bear the ſucceeding ſummer; becauſe the wood which has produced fruit, is commonly cut quite away after the fruit is gathered, or at leaſt is ſhortened down to two eyes, to force out ſhoots for the next year, where there is not a ſufficient number of branches upon the vine, of thoſe trained upright; ſo that in ſummer, when the vines are in perfection, there ſhould be ſix upright ſhoots trained for the choice of next years wood, and three or four bearing branches with fruit, for more than theſe ought never to be on the vine.

VINOUS, *Vinoſus*, ſomething that relates to wine, or that has the taſte and ſmell thereof.

All vegetables, by a due treatment, afford a vinous liquor, as corn, pulſe, nuts, apples, grapes, &c. A ſecond fermentation, duly managed, turns any vinous liquor into an acetous one. The proper character and effect of fermentation, are to produce either a vinous or an acetous quality in the body fermented. See FERMENTATION, WINE, and VINEGAR.

VINTAGE, a crop of wine, or what is got from the vines each ſeaſon.

The word is alſo uſed for the time or ſeaſon of gathering or preſſing the grapes. See the articles WINE, &c.

VINUM, a liquor, or drink, commonly called wine. See the article WINE.

VIOL, *Viola*, a muſical inſtrument of the ſame form with the violin, and ſtruck like that with a bow.

There are viols of divers kinds; the firſt, and principal, among us, is the baſs-viol, called by the Italians, viola-digamba, or the leg-viol, becauſe held between the legs. It is the largeſt of all, and is mounted with ſix ſtrings: its neck is divided in half notes by ſeven frets fixed thereon: its ſound is very deep, ſoft, and agreeable.

The tablature, or muſic for the baſs-viol, is laid down on ſix lines or rules. What the Italians call alto viola, is the counter-tenor of this; and their tenore viola, the tenor. They ſometimes call it ſimply the viol: ſome authors will have it the lyra, others the cithara, others the chelys, and others the teſtudo of the ancients.

2. The love-viol, viola d'amore, which is a kind of triple-viol, or violin, having ſix braſs or ſteel ſtrings, like thoſe of the harpſichord, ordinarily played with a bow. This yields a kind of ſilver ſound which is very agreeable.

3. A large viol with forty-four ſtrings, called by the Italians, viola di bardone, but little known among us.

4. Viola baſtarda, or baſtard-viol of the Italians; not uſed among us. Broſſard takes it to be a kind of baſs-viol, mounted with ſix or ſeven ſtrings, and tuned as the common one.

5. What the Italians call viola di braccio, arm-viol (or ſimply, braccio, arm) is an inſtrument anſwering to our counter-tenor, treble, and fifth violin.

6. Their viola prima, or firſt viol, is really our counter-tenor violin; at leaſt, they commonly uſe the cliff C *ſol ut* on the firſt line, to denote the piece intended for this inſtrument.

7. Viola ſecunda, is much the ſame with our tenor-violin, having the cliff of C *ſol ut* on the ſecond line.

8. Viola terza, is nearly our fifth violin, the cliff C *ſol ut* on the third line.

9. Viola quarta, or fourth viol, is not known in England or France, though we frequently find it mentioned in the Italian compoſitions; the cliff on the fourth line.

Laſtly, their violetta, or little viol, is in reality our triple-viol, though ſtrangers frequently confound the term with what has been ſaid of the viola prima, ſecunda, &c. See VIOLIN.

VIOL, is alſo a term uſed among mariners, when a hawſer, or ſtrand-rope, is bound faſt with nippers to the cable, and brought to the jeer-capſtan, for the better weighing of the anchor when the main-capſtan proves inſufficient.

VIOLA, the violet, in botany. See VIOLET.

VIOLATION, the act of violating; that is, forcing a woman, or committing a rape upon her.

This term is alſo uſed, in a moral ſenſe, for a breach or infringement of a law, ordinance, or the like; and it is alſo uſed for profanation. See the articles RAPE, &c.

VIOLENT, in the ſchools, a thing done by force: in which ſenſe, it ſtands oppoſed to ſpontaneous. See SPONTANEOUS.

A thing is ſaid to be violent when effected by ſome external principle, the body that undergoes it contributing nothing thereto, but ſtruggling againſt it. The ſchoolmen allow, that man, as being endued with reaſon, is capable of ſuffering ſuch violence, but brute and inanimate bodies are not. See INANIMATE, &c.

VIOLET, *Viola*, in botany, a genus of plants, whoſe flower conſiſts of five ringent irregular petals, with a corniculated nectarium at the baſe; the ſtamina are five ſmall filaments, topped with obtuſe antheræ, which are ſometimes connected: the fruit is an ovate trigonal obtuſe capſule, having one cell, which contains many ovate ſeeds.

The common ſweet-ſcented violet is ſo well known as to need no deſcription; it grows in gardens, in woods, and under hedges, in many parts of England, and is eaſily increaſed by parting the roots.

The leaves and flowers are uſed in medicine, and ſometimes the roots; the flowers are a little purgative, and the ſyrup made of them is common, which, when well managed, is of a beautiful colour, and an uſeful laxative for children.

Bulbous VIOLET, in botany. See the article GALANTHUS.

Dames VIOLET, in botany. See the article HESPERIS.

VIOLIN, or FIDDLE, a muſical inſtrument mounted with four ſtrings, or guts, and ſtruck or played with a bow.

The violin, like moſt other inſtruments, conſiſts of three parts, the neck, the table, and the ſoundboard. At the ſides are two apertures, and ſometimes a third is added towards the top, ſhaped like a heart. Its bridge, which is below the apertures, bears up the ſtrings which are faſtened to the two extremes of the inſtrument, at one end of them to a ſcrew, which ſtretches or looſens them at pleaſure.

The ſtyle and ſound of the violin is the gayeſt, moſt lively, and ſprightly, of all other inſtruments; and hence it is, of all others, the fitteſt for dancing: yet there are ways of touching it which render it grave, ſoft and languiſhing, and fit for church or chamber muſic. It generally makes the treble or higheſt parts in concerts. It is tuned by fifths: its play is compoſed of baſs, counter-tenor, tenor, and treble: each part has four-fifths, which riſe to a greater ſeventeenth. See the article FIFTH, &c.

In compoſitions of muſic the violin is denoted by V; two V V denote two violins. The word violin, alone, ſtands for treble violin. When the Italians prefix alto, tenore, or baſſo, it then expreſſes the counter-tenor, tenor, or baſs violin. In compoſitions, where there are two, three, or more different violins, they make uſe of primo, ſecondo, terzo, or of the characters I°, II°, III°, or 1°, 2°, 3°, &c. to denote the difference.

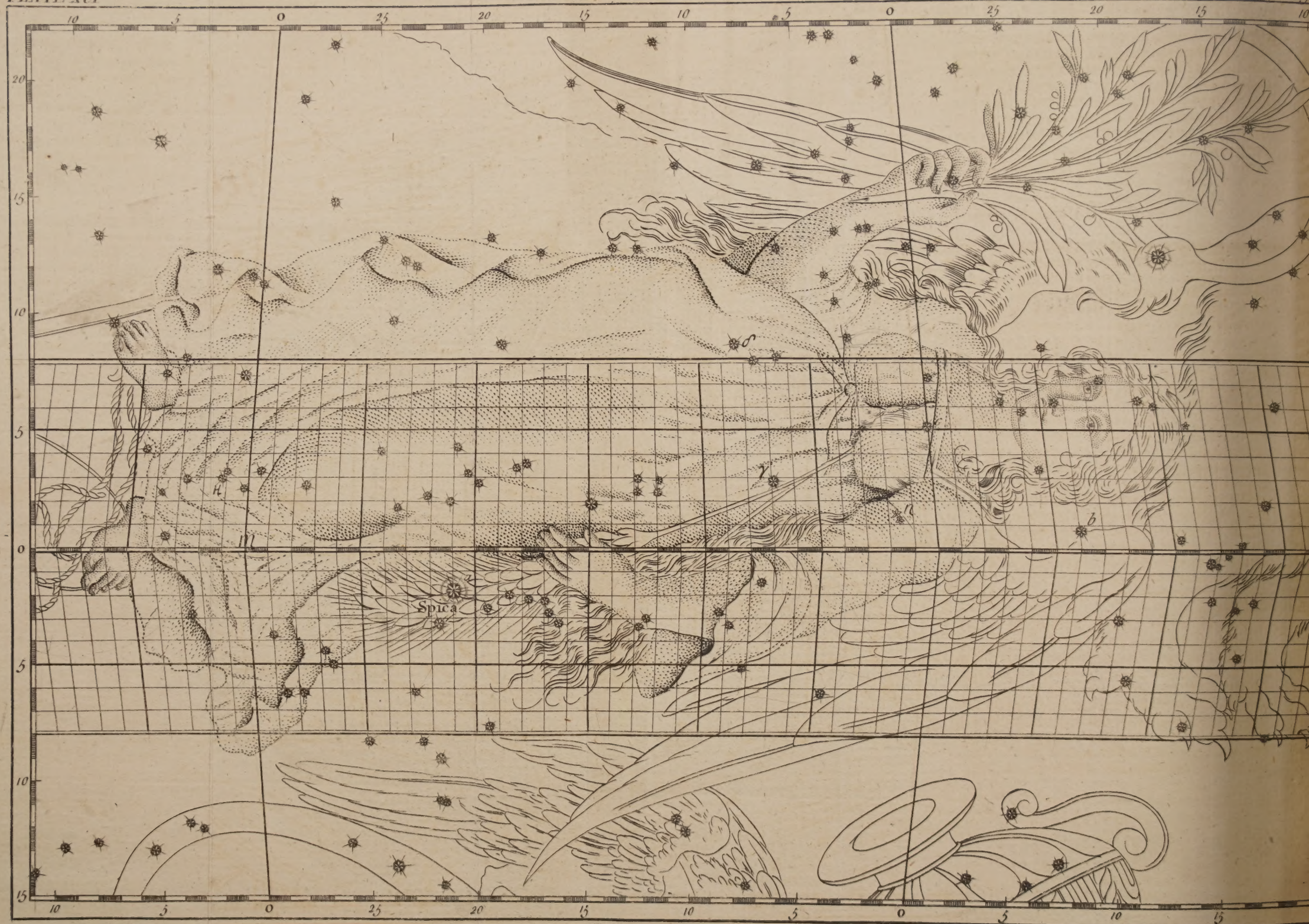
The violin has only four ſtrings, each of a different thickneſs; the ſmalleſt whereof makes the *e ſi mi* of the higheſt octave of the organ; the ſecond, a fifth below the firſt, makes the *a mi la*; the third, a fifth below the ſecond, is *d la re*; laſtly, the fourth, a fifth below the third, is *ge re ſol*. Moſt nations ordinarily uſe the cliff *ge re ſol* on the ſecond line, to denote the muſic for the violin only. In France they uſe the ſame cliff as the firſt line at bottom. The firſt of theſe methods is beſt where the ſong goes very low; the ſecond, where it goes very high.

VIOLONCELLO of the Italians is properly our fifth violin; which is a little baſs-violin, half the ſize of the common baſs-violin, and its ſtrings juſt half as thick and half as long, which renders the ſound juſt an octave higher than the ſame.

VIOLONE, in muſic, a double baſs, almoſt twice as big as the common baſs-violin, and the ſtrings bigger and longer in proportion, and conſequently its ſound an octave lower than that of our baſs-violin, which has a noble effect in great concerts.

VIPER, in zoology, a ſpecies of coluber, with the ſcuta of the abdomen an hundred and forty-five, and the ſqammæ of the tail, thirty-ſix.

This is the moſt poiſonous and miſchievous in its bite of all the European ſerpents. It grows to near three feet in length, and to a conſiderable thickneſs in proportion. The principal ground colour of the body is a duſky grey; all along the back there runs a broad line, which is dentated on each ſide; and on each ſide of this there is a kind of bluiſh line, formed



VIRGO

formed of a ſeries of ſpots of that colour, one of which is ſituated in the ſpace formed by every denticulation in the back line: the belly is of a bluiſh black, very bright and gloſſy, reſembling the colour of high poliſhed, ſanguined ſteel; and when cloſely examined, there is found a ſmall dot of a deep black at the apex of every ſcale. The head is large and flattiſh; the throat is of a pale colour; and the mouth is large: the edge of the upper lip is whitiſh: the iris of the eye is of a flame colour; the pupil black; and there is a blue ſpace, forming an acute angle, which ſeparates the head from the longitudinal line on the back.

The poiſon of this ſerpent is confined to its mouth: at the baſis of the phangs, or long teeth, which it wounds with, is lodged a little bag containing the poiſonous liquid, a very minute portion of which mixed immediately with the blood, proves fatal. Our viper-catchers are ſaid to prevent the miſchiefs otherwiſe following from the bite, by rubbing oil-olive on the part. The fleſh of the viper is perfectly innocent, and ſtrongly recommended as a medicine of extraordinary ſervice in ſchrophulous, leprous, and other chronical diſorders: its virtues however in theſe caſes, are probably too much exaggerated. The viper is undoubtedly a high nutritious food, and thence, in ſome kinds of weakneſſes and emaciated habits, is not undeſervedly looked on as a good reſtoritive. To anſwer any valuable purpoſes, freſh vigorous vipers, not ſuch as have been long kept alive after they are caught, ſhould be liberally uſed as food. The wines and tinctures of them can ſcarce be ſuppoſed to receive any conſiderable virtue from the animal. The dry fleſh brought us from abroad is entirely inſignificant.

VIPER's BUGLOSS, in botany. See the article ECHIUM.

VIPER's GRASS. See SCORZONERA.

VIRGA, a yard. See YARD.

VIRGA is particularly uſed in law for a verge, or rod, ſuch as ſheriffs and bailiffs carry as a badge of their office.

VIRGÆ, in phyſiology, a meteor called alſo columellæ and funes tentorii; being an aſſemblage of ſeveral ſtreams of light, repreſenting a bundle of rods or ropes. It is ſuppoſed owing to the ſtreaming of the ſun's beams through certain rimulæ, or chinks, at leaſt through the more lax and open parts of a watery cloud, happening chiefly in the morning and evening. There is alſo another kind, conſiſting not of ſtreams of mere white light, but, as it were, painted of various colours like thoſe of the rainbow.

VIRGIN, *Virgo*, a female who has had no carnal commerce with man; or more properly, who has ſtill the flos virginis or maidenhead.

VIRGIN is alſo applied figuratively to ſeveral things that retain their abſolute purity, and have never been made uſe of. Thus virgin-wax is that which has never been wrought, but remains as it came out of the hive. Virgin oil is that which oozes ſpontaneouſly out of the olive, &c. without preſſing. Virgin-gold, is that metal ſuch as it is found pure in the mine, without any mixture of allay; in which ſtate it is ſometimes ſo ſoft that it will take the impreſſion of a ſeal. Virgin-copper is a native copper found in the mine, and which has never been melted down. Virgin quick-ſilver is that found perfectly formed and fluid in the veins of mines; or at leaſt ſuch as is got from the mineral earth by mere lotion, without fire. Virgin-parchment is that made of the ſkin of an abortive lamb, &c. See the articles WAX, OIL, &c.

VIRGIN's-BOWER, *Clematis*, in botany. See CLEMATIS.

VIRGIN's-THREAD, a ſort of meteor that flies in the air like ſmall untwiſted ſilk; which falling upon the ground, or upon plants, changes itſelf into a ſubſtance like a ſpider's web. In theſe northern climates it is moſt frequent in ſummer, the days being then temperately warm, the earth not exceeding dry, nor yet overcharged with moiſture. This has formerly paſſed for a ſort of dew of an earthy ſlimy nature: but naturaliſts are now agreed that the virgin's threads are no other than ſo many ſpiders webs. See the article SPIDER's-WEB.

VIRGO, in aſtronomy, one of the ſigns, or conſtellations of the zodiac, into which the ſun enters in the beginning of Auguſt.

The ſtars in the conſtellation Virgo, in Ptolemy's catalogue, are 32; in Tycho's, 39; in the Britannic, 89. The longitudes, latitudes, magnitudes, &c. of which, are as follow.

Names and Situations of the Stars.	Signs.	Longitude. ° ′ ″	Latitude ° ′ ″		Magn.
That preced. Virgo's head	♍	18.30. 5	5.19.13	N	6
North in the top of the head		20. 29	6. 6.21	N	5
South		20.49.35	4.35.39	N	5
Subſeq. and leſs in the top of the head		20.37.15	6 21.33	N	6
		23.46.14	40.47	N	3
5.					
		22. 9.47	7.14.53	N	6
		25.12.31	3.20.31	N	5 6
South in the face		24.13.29	6. 8.52	N	5
North		24.23. 6	8.31.29	N	5
		28. 8.22	2.42.52	N	6
10.					
		26.39.56	6.19.31	N	6
		25.38.13	10.44.24	N	6 7
	♎	1.16.44	1. 8. 8	N	6
		4.39.31	6.16.20	S	7
Preced. in the ſouth wing		1.30.52	1.22. 1	N	4 3
15.					
That in the neck		2.17	5. 4.22	N	5
	♍	29.44. 8	7. 7. 4	N	6
	♎	7.52	12.43.22	N	6
		8. 9.52	5.19.47	S	6
In the ſouth arm		7.29.	1.42.25	S	6
20.					
Firſt of three under ſouth arm		8.50.38	3.27.23	S	5
		2. 3. 5	13.41.37	N	6
		9.15.49	2.44.25	S	6
Second of the ſouth wing		6.52.11	2.48.53	N	3
Preced. of three in the north wing		2.10.33	13.32.49	N	5
25.					
		3.36.19	10.24.41	N	6
South of the north wing		4. 6.26	11.34.19	N	5 6
		3.28.51	13.22.45	N	6 7
		2.42.23	15.38.52	N	6
		2.10.31	17.47.57	N	6
30.					
		7.20.45	7.55.15	N	7
		2.31.30	3. 3.16	S	6
Middle under the ſouth arm		12.52.25	3.25.22	S	5
		4. 3.20	6.43.39	N	6
In the north ſide againſt the girdle		8. 9.55	8.38.27	N	3
35.					
Third of the ſouth wing		11.52.55	2.21.50	N	6
		11.55.41	2 51.56	N	7
Upper of north wing vindemiatrix		6.37.40	16.12.34	N	5
		12.47.27	2.55. 7	N	7
Third under the ſouth arm		16.25. 9	3.16. 3	S	5
40.					
		15.44.20	1.26.51	S	6
		16.41.28	2.42.31	S	6
Fourth and laſt of the ſouth wing		14.54.23	1.45,29	N	4
Firſt of three under ſpica		19.25.56	7.53.20	S	4 5
		20.46.20	10.12. 6	S	6
45.					

Names and Situations of the Stars.	Signs	Longitude	Latitude		Magn.
	♎	° ′ ″	° ′ ″		
That following vindemiatrix		21.30.30	11. 6.24	S	6
That following north wing		10.41.24	16.13. 6	N	7
Middle under ſpica		12.27.17	12.39.30	N	5
		21.43.10	9. 9.50	S	45
		22.29. 8	8.19.33	S	56
50.					
		14.52. 5	9.58.50	N	7
In ſouth hand		13.39. 6	12.48.11	N	6
Underneath ſpica		20.31.22	2. 1.59	S	1
Laſt, and north. of three under ſpica		21.26.48	3.18.24	S	6
		22.49.15	6.17.54	S	56
55.					
		11.38.12	21.24.25	N	6
North of preced. in ſquare of thigh		13. 4.17	18.42.49	N	6
		19.39.18	2.47.25	N	6
Second		24.52.19	8.26.42	S	5
		20.16.27	3. 8 55	N	6
60.					
		23.48.30	5.14.34	S	6
South of preced. in ſquare of thigh		25.55.51	24. 7	S	6
		20.44.11	2.55.30	N	7
Another following north wing		17. 3.48	12.33. 1	N	6
Under the girdle, as in the hip		18.49.50	8.39. 9	N	3
65.					
Third in ſquare of thigh		20.46.12	4.15.21	N	6
		22.10. 4	2. 9.18	N	6
North. of thoſe foll. in ſquare of thigh		23.23.31	1.43.45	N	6
That over the girdle		19.15. 4	13.16 45	N	6
		26.44.18	4.59.33	S	7
70.					
		26.50.19	4.30.31	S	6
In ſouth knee		25.43. 6	1.21.46	S	5
		27.59.34	6.18.29	S	6
		24.16. 7	4. 4. 4	N	6
		28.39.20	6.21.37	S	56
75.					
In north thigh		23.52.22	9.37.22	N	6
		23.21.36	12. 9.54	N	6
That over the north thigh		24.24.56	13. 4.50	N	5
		29.10.30	3.41.47	N	6
		29.25.25	3.19.59	N	6
80.					
South of three in the border of garment	♍	1.10.40	2.55.40	N	4
Middle in the border		27.27	7.15.37	N	4
In extrem. of ſouth foot		3.38.13	31. 4	N	4
North of three in the garment		4.41	11. 3. 1	N	5
		33. 5	11.30. 3	N	5
85.					
A bright one following theſe		2. 8.14	11.47.25	N	4
In extrem. of the north foot		6.47.23	9.43. 8	N	4
		5.22.44	15.56.52	N	6
		5.10.50	17. 7.21	N	4

VIRGULA DIVINA, or BACULUS DIVINATORIUS, &c. a forked branch, in the form of a Y, cut off a hazle ſtick, by means whereof people have pretended to diſcover mines, ſprings, &c. under ground.

The method of uſing it is thus: the perſon who bears it, walking very ſlowly over the places where he ſuſpects mines or ſprings may be, the effluvia exhaling from the metals, or vapour from the water, impregnating the wood, makes it dip or incline, which is the ſign of a diſcovery.

Some diſpute the matter of fact, and deny it to be poſſible. Others, convinced by the great number of experiments alledged in its behalf, look out for the natural cauſes thereof: the corpuſcles (ſay thoſe authors) riſing from the ſprings or minerals, entering the rod, determine it to bow down, in order to render it parallel to the vertical lines whic the effluvia deſcribe in their riſe.

VIRGULTUM, in our ancient law-books, is uſed for a holt or a plantation of twigs or oſiers. See OSIERS.

VIRILE, ſomething that belongs or is peculiar to a man, or the male ſex: thus the virile member is uſed for the penis; virile age, the ſtrength and vigour of a man's age, viz. from thirty to forty-five years, being the age wherein we are equally removed from the extremes of youth and of old age.

VIRTUAL, or POTENTIAL, ſomething that has a power or virtue of acting or doing. The term is chiefly underſtood of ſomething that acts by a ſecret inviſible cauſe, in oppoſition to actual and ſenſible

VIRTUAL FOCUS, in optics. See FOCUS.

VIRTUALITY, in the ſchools, denotes ſome mode or analogy in an object, which, in reality, is the ſame with ſome other mode, but, out of regard to contradictory predicates, is conſidered as if diſtinct therefrom.

VIRTUALLY, in the ſchools, is applied to a mode of exiſtence. A thing is ſaid to be virtually any where, when it is deemed to be there by ſome virtue, influence, or other effect, produced by it: thus the ſun is virtually on earth, i. e. by his light, heat, &c. A thing is alſo ſaid to be virtually preſent, when the virtues or properties belonging to it, and iſſuing from it, remain: in which ſenſe the forms of the elements are held to be virtually in mixed bodies. A thing is ſaid to be a cauſe virtually, or a virtual cauſe, and that two ways; the firſt, when there is no real diſtinction between it, and the effect attributed to it, and yet it is conceived by us, as if it were really the cauſe thereof: thus immutability in God, is the cauſe of eternity. Secondly, when an effect is not of the ſame kind with the cauſe, and yet the cauſe has the power or virtue of producing the effect; thus the ſun is not formally but virtually hot; and the fire is not contained formally but virtually in heat

VIRTUE, *Virtus*, a term uſed in various ſignifications. In the general it denotes power, or perfection of any thing, whether natural or ſupernatural, animate or inanimate, eſſential or acceſſary. But in its more proper or reſtrained ſenſe, virtue ſignifies an habit, which improves and perfects the poſſeſſor and his actions. See the article HABIT, &c.

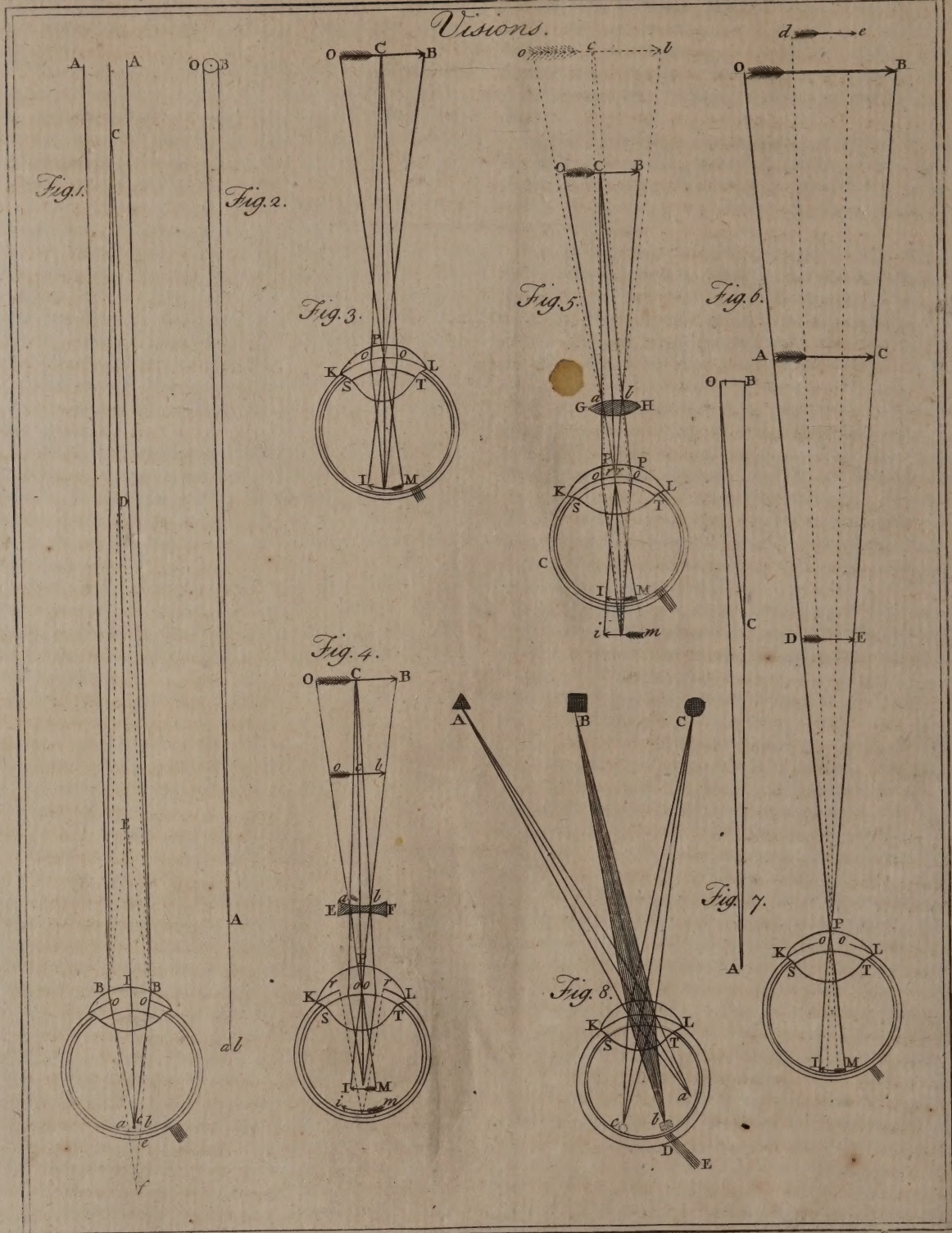
In this ſenſe virtue is a principle of acting or doing well and readily, and that either infuſed from above, ſuch as are the theological virtues; or acquired by our own application, as the intellectual or moral virtues

For as there are two things in man, from which all his actions proceed, viz. the underſtanding and the will; ſo the virtue by which he is perfected, or whereby he is diſpoſed to do all things rightly, and to live happily, muſt be twofold: the one of the underſtanding, and the other of the will. That which improves the underſtanding is called intellectual, or dianoetic; and that, the will, moral and ethic; for ſince there are two things required, in order to live aright, viz. to know what ſhould be done, and, when known, readily to perform it; and ſince man is apt to err various ways in each reſpect, unleſs regulated by diſcipline, &c. he alone can deport himſelf rightly in his whole courſe of life, whoſe underſtanding and will have obtained their utmoſt perfection

Intellectual virtue, then, according to Ariſtotle, is an habit of the reaſonable ſoul, whereby it conceives or ſpeaks the truth, either in affirming or denying. The virtues which come under this claſs are divided into ſpeculative, which are thoſe converſant about neceſſary things, that can only be known or contemplated; and practical, which are converſant about contingent things, that may likewiſe be practiſed. Ariſtotle has another diviſion of intellectual virtues, fetched from the ſubject, as ſome of them are ſeated in the contemplative part, viz. thoſe converſant about neceſſary things, as ſcience, wiſdom, intelligence; and others in the practical part, ſuch are thoſe converſant about contingent things, as prudence, art, &c. See the article SCIENCE, &c. Moral virtue is defined, by Ariſtotle, to be an elective habit, placed in a mediocrity, determined by reaſon, and as a prudent man would determine. Moraliſts uſually diſtinguiſh four principal, or, as they are vulgarly called, cardinal virtues, viz. prudence, juſtice, fortitude, and temperance: the reaſon of which diviſion is founded in this, that for a man to live virtuouſly and honeſtly, it is neceſſary he know what is fit to be done, which is the buſineſs of prudence: that he have a conſtant and firm will to do what he judges beſt; which will perfect the man, either as it reſtrains too violent perturbations, the office of temperance; or as it ſpurs and urges on thoſe that are too ſlow and languid, which

PLATE XCII

Facing Vision.



J. Lodge sculp.

is the buſineſs of fortitude; or, laſtly, comparatively with regard to human ſociety, which is the object of juſtice. To theſe four virtues all the reſt are referred, either as parts, or concomitants. See the articles PRUDENCE, &c.

VIRTUES, in the celeſtial hierarchy, the third rank or choir of angels, being that in order between the denominations and powers: to theſe is attributed the power of working miracles, and of ſtrengthening and reinforcing the inferior angels in the exerciſe of their functions.

VIRTUOSO, an Italian term lately introduced into Engliſh, ſignifying a man of curioſity and learning, or one who loves and promotes the arts and ſciences; but among us the term ſeems to be appropriated to thoſe who apply themſelves to ſome curious and quaint, rather than immediately uſeful, art or ſtudy, as antiquaries, collectors of rarities of any kind, microſcopical obſervers, &c.

VIRULENT, a term applied to any thing that yields a virus, that is a contagious or malignant pus.

VIS, a Latin word, ſignifying force or power, adopted by phyſical writers to expreſs divers kinds of natural powers or faculties.

VISCAGO, in botany, the ſame with ſilene. See the article SILENE.

VISCERA, in anatomy, a term ſignifying the ſame with entrails, including the heart, liver, lungs, ſpleen, inteſtines, and other inward parts of the body.

VISCIDITY, or VISCOSITY, the quality of ſomething that is viſcid or viſcous, that is, glutinous and ſticky, like bird-lime, which the Latins call viſcus.

Viſcid bodies are thoſe which conſiſt of parts ſo implicated within each other, that they reſiſt a long time a complete ſeparation; and rather give way to the violence done them, by ſtretching or extending every way.

The too great viſcidity of foods has very ill effects; thus meats, or farinæ, not fermented, gellies, &c. of animals, tough cheeſe, or curds too much preſſed, produce a weight or oppreſſion in the ſtomach, wind, yawnings, crudities, obſtructions of the minuter veſſels in the inteſtines, &c. Hence an inactivity of the inteſtines themſelves, a ſwelling of the abdomen; and hence a viſcidity of the blood, from the re-union of the viſcid particles; obſtructions of the glands; paleneſs, coldneſs, tremors, &c.

VISCOUNT. See VICOUNT.

VISCUM, miſſeto, in botany. See the article MISLETO.

VISIBLE, ſomething that is an object of ſight or viſion, or ſomething whereby the eye is affected, ſo as to produce a ſenſation.

VISIER, or VIZIER, an officer or dignitary in the Ottoman empire, whereof there are two kinds; the firſt called by the Turks viſier-azem, that is, grand viſier, is the prime miniſter of ſtate of the whole empire. He commands the army in chief, and preſides in the divan or great council. Next to him are ſix other ſubordinate viſiers, called viſiers of the bench, who officiate as his counſellors, or aſſeſſors in the divan.

VISION, *Viſio*, in optics, the act of ſeeing or perceiving external objects, by means of the organ of ſight, the eye. See the article EYE.

Such is the ſubſtance and form of the humours of the eye, when lodged in their proper receptacles, that rays of light in paſſing through them, are affected in like manner as in paſſing through a convex lens; and therefore, to underſtand perfectly the nature of viſion, we muſt firſt be acquainted with the doctrine of light and lenſes. See LIGHT and LENS.

Now as the ſeveral pencils of rays flowing from the diſtinct points in the ſurface of an object placed before a lens, are collected into ſo many points at a certain diſtance on the other ſide of the lens, and form an image there, when received upon paper; ſo pencils of rays proceeding from an object placed before the eye at a proper diſtance from it, and being refracted in paſſing through the humours of it, are collected into their reſpective foci upon the retina, where they form a repreſentation of that object; and by their impulſes upon the tender nerves of the retina, an idea of the object is excited in the mind. See REFRACTION.

Viſion is diſtinguiſhed into bright and obſcure, diſtinct and confuſed. It is ſaid to be bright when a ſufficient number of rays enter the pupil at the ſame time; and obſcure, when too few: it is called diſtinct when each pencil of rays is collected into a focus exactly upon the retina; and confuſed, when they meet before they come at it, or when they would paſs it before they meet.

Now ſince parallel rays only have their focus upon, or meet in, the retina, they alone can paint there a diſtinct image of an object, or produce a diſtinct viſion of it. If, therefore, the object be ſo near, that the rays from any particular point come diverging to the pupil, they will neceſſarily require a greater focal diſtance than the retina or bottom of the eye; whence the rays not being united upon the retina, that point cannot be there diſtinctly repreſented, but will appear confuſed, thus, A B, A B (plate XCII. fig. 1.) are two parallel rays falling upon the pupil of the eye; and C B, C B, two other rays, which though really diverging, yet, by reaſon of the remoteneſs of the point C, whence they proceed, will at the entrance of the eye be ſo nearly coincident with the parallel rays, as to have nearly the ſame focal point on the retina, ſo that the point C will there be diſtinctly repreſented by *c*. But if any other point E, be viewed very near the eye, ſo that the angles E B A, which they contain

tain with the parallel rays, be very conſiderable, they will, after refraction tend towards the point *f*, in the axis of the eye produced, and upon the retina will repreſent only a circular indiſtinct area; like that at *e*, whoſe breadth is equal to *a b*, the diſtance of the rays upon the retina. The ſame point at D, will not be quite ſo much dilated, as the rays D B, D B, have a leſs degree of divergence.

It is found by experience, that the neareſt limit of diſtinct viſion is about ſix inches from the eye; for if a book be held nearer to the eye than that, the letters and lines will immediately become confuſed and indiſtinct. Now this cauſe of indiſtinct viſion may be in ſome meaſure remedied, by leſſening the pupils, which we naturally do in looking at near objects, by contracting the annular fibres of the uvea; and artifically, by looking through a ſmall hole made with a pin in a card, &c. for then a ſmall print may be read much nearer than otherwiſe: the reaſon is plain, for the leſs the diameter of the aperture or pupil B B, the leſs will the rays diverge in coming from D or E, or the more nearly will they coincide with parallel rays.

Beſides the contraction of the pupil, nature has furniſhed the eye with a faculty of adapting the conformation of the ſeveral parts to the reſpective poſitions of objects, as they are nigh or more remote; for this purpoſe the cornea is of an elaſtic yielding ſubſtance, and the cryſtalline is incloſed with a little water in its capſula, that by the contraction and relaxation of the ciliary ligament, the convexity of both the ſurfaces of the capſula may be a little altered, and perhaps the poſition of the cryſtalline; by which means the diſtance from the retina may be fitted and adjuſted to nigh objects, ſo as to have their images very diſtinctly formed upon the retina.

Nigh objects only have been mentioned (by which are meant ſuch as are near the limit of diſtinct viſion, as between ſix and a hundred inches diſtance) becauſe remoter objects require ſcarce any change of the conformation of the eye; the focal diſtance in them varying ſo very little. Thus, ſuppoſe all the refraction of the eye were equivalent to that of a double and equally convex lens, whoſe radius $r=1$ inch: if then the object were 10 inches diſtant, or $d=10$, we ſhould have the focal diſtance $f=\frac{dr}{d-r}=\frac{10}{9}=0.11111$; and if another object be diſtant 100 inches, then $d=100$, and $f=\frac{dr}{d-r}=\frac{100}{99}=0.10101$. The difference between theſe two focal diſtances is 0.0101, viz. the hundredth part of an inch, which the eye can eaſily provide againſt. If we go beyond this, ſuppoſe to an object 1000 inches diſtant, we have $f=\frac{dr}{d-r}=0.1001001$, which is only the thouſandth part of an inch leſs than the former, and is therefore inconſiderable.

Now, rays proceeding from any point, more than 6 inches diſtant from the eye, will, when they enter the pupil, be very nearly coincident with parallel rays; and therefore, to a ſound eye, diſtinct viſion cannot be effected at leſs than 6 or 8 inches diſtance, as may be found by any one who will make the experiment.

Six inches, therefore, conſtitutes the limit of diſtinct viſion, for near objects: we ſhall now conſider the limit for remote objects; for objects may appear indiſtinct and confuſed, by being removed too far from the eye, as well as when they are too near it. And in this caſe, we find objects will appear diſtinct ſo long as their parts are ſeparate and diſtinct in the image formed on the retina; and thoſe parts will be ſeparate ſo long as the axis of the pencils of rays, which paint them, are ſeparate at their incidence on the retina; that is, ſo long as the angle they contain is not leſs than one-tenth of a degree: for it is found, by experience, that objects and their parts become indiſtinct, when the angle they ſubtend at the pupil of the eye is leſs than that quantity.

Thus, ſuppoſe O B (fig. 2.) to be a circle one-tenth of an inch in diameter, it will appear diſtinct with its central ſpot, till you recede to the diſtance of 6 feet from it, and then it becomes confuſed; and if it be one-fifth of an inch, it will begin to be confuſed at 12 feet diſtance, and ſo on; in which caſes, the angle ſubtended at the eye, viz. O A B, is about one-tenth of a degree, or 6 minutes.

And thus all objects, as they are bigger, appear diſtinct at a greater diſtance; a ſmall print will become confuſed at a leſs diſtance than a larger; and in a map of England, the names of places in ſmall letters become firſt indiſtinct, where thoſe in capitals are very plain and legible; at a bigger diſtance theſe become confuſed, while the ſeveral counties appear well defined to a much greater diſtance: theſe alſo at laſt become ſo indiſtinct as not to be known one from another, when at the ſame time the whole iſland preſerves its form very diſtinctly to a great diſtance; which may be ſo far increaſed, that it alſo, at laſt, will appear but a confuſed and unmeaning ſpot.

We have ſeen the cauſes of indiſtinct viſion in the objects, and ſhall now enquire what may produce the ſame in the eye itſelf.

And firſt it is to be obſerved, that there is a proper degree of convexity in the cornea K P L (fig. 3.) and cryſtalline S T, for converging parallel rays to a focus on the bottom of the eye, in a ſound ſtate; hence every diſtant object O B, will have its image I M, accurately depicted on the retina, and by that means produce diſtinct viſion.

But if the cornea K P L (fig. 4.) or cryſtalline S T, or both, ſhould chance to be a little more convex than juſt, it will cauſe the pencil of rays *o* C *o*, which comes to the pupil *o o*, from any point C in the object

ject O B, to unite in a focus before they arrive at the retina in the bottom of the eye; the image I M, of the object O B, will be formed in the body of the vitreous humour, and will therefore be very confuſed and indiſtinct on the retina at *i m*. A perſon having ſuch an eye, is called myops, in alluſion to the eye of a mouſe, by reaſon of its great convexity. To remedy this defect of the eye, a concave lens E F, is applied before it; for by this means the rays C *a*, C *b*, which fall diverging on the lens, will, after reflection through it, be made to proceed ſtill more diverging, *viz.* in the directions *a r*, *b r* (inſtead of *a o*, *b o*) as if they came from the point *c*, inſtead of C. Hence it follows, that ſince the rays are made to fall with greater divergence upon the eye, they will require a greater focal diſtance to be united in the axis; and, conſequently, the focus may be made to fall very nicely on the retina, by uſing a lens E F, of a proper degree of concavity; ſo that diſtinct viſion will be effected, in the ſame manner as in an eye of a juſt conformation.

Since the point *c*, is nearer to the eye than the point C, the apparent place of objects ſeen through a concave lens is nearer than the true place; or the object will appear at *O B*, inſtead of O B; and alſo, ſince converging rays O *a*, B *b*, proceed leſs converging after refraction than before, the object appears under a leſs angle; and, therefore, the apparent magnitude of objects, ſeen by a concave lens, is leſs than the true: the object is alſo leſs luminous or bright, ſeen thro' ſuch a lens, than without it; becauſe the rays being rendered more divergent, a leſs quantity enters the pupil of the eye, than otherwiſe would do: for the picture is always more or leſs bright, according as it is made by a greater or leſs quantity of rays. Laſtly, it appears from what has been ſaid, that when a concave lens E F, cannot be applied, we may ſtill effect diſtinct viſion, by leſſening the diſtance between the object and the eye: for it is plain, if O B be ſituated at *O B*, the image I M, will recede to *i m*, upon the retina, and be diſtinct, in the ſame manner as when made ſo by the lens E F.

On the other hand, when the cornea or cryſtalline is too flat, &c. (as often happens by age) an object O B (fig. 5.) placed at the ſame diſtance from the eye P C, as before, will have the rays C *o*, C *o*, after refraction in the eye, proceed to a focus beyond the bottom of the eye, in which, if a hole were made (in an eye taken out of the head) the rays would actually go on, and form the image *i m*; which image muſt, therefore, be very confuſed and indiſtinct on the retina. To remedy this defect, a convex lens G H, is applied, which cauſes the diverging rays C *a*, C *b*, to fall leſs diverging upon the eye, or as if they came from a point more remote, as *c*; by which means the focal diſtance is ſhortened, and the image duly formed on the retina at I M, by which diſtinct viſion is produced.

Hence the apparent place of the object at *c*, is more diſtant than the true place is at C; and its apparent magnitude *O B* is greater than the true, becauſe the converging rays O *a*, B *b*, are by this lens after refraction made to unite ſooner than before, and ſo to contain an angle *O P B* greater than the true O P B. The object appears through a lens brighter than without, becauſe by this means a greater quantity of rays enter the pupil; for the rays *a o*, *b o*, are by the lens made to enter in the directions *a r*, *b r*, which are nearer together, and leave room for more to enter the pupil all around between *o* and *r*.

As the image of the object painted on the retina is greater or leſs, ſo will the apparent magnitude of the object be likewiſe; or, in other words, the angle I P M (fig. 6.) ſubtended by the image is always equal to the angle O P B ſubtended by the object at the eye, and therefore the image I M will be always proportionable to the object O B. Hence it follows, that the angle O P B under which an object appears, is the meaſure of its apparent magnitude.

Therefore objects of different magnitudes, as O B, A C, D E, which ſubtend the ſame angle at the eye, have the ſame apparent magnitude, or form an equal image in the bottom of the eye. Hence it is that objects at a great diſtance have their magnitude diminiſhed proportionally; thus the object D E removed to *D E* appears under a leſs angle *D P E*, and makes a leſs image on the retina, as is ſhewn by the dotted lines.

The angles of apparent magnitude O A B, O C B, (fig. 7.) when very ſmall, are as their ſines, and therefore as the ſides O C and O A, or B C and B A; that is, the apparent magnitude of the object O B, at the diſtances B C and B A, is inverſely as thoſe diſtances; or its magnitude at C is to that at A as A B to C B.

The more directly any object is ſituated before the eye, the more diſtinctly it will appear; becauſe thoſe rays only which fall upon the eye near its axis can be convened to a point in the bottom of the eye on the retina, and therefore that part of the image only which is formed by the direct pencil of rays can be clear and diſtinct; and we are ſaid to ſee an object by ſuch a pencil of rays, but only to look at it by the others which are oblique. Suppoſe A, B, C, (fig. 8.) repreſent three pieces of paper ſtuck up againſt the wainſcot of a room at the height of the eye; if then a perſon places himſelf ſo before them, and ſhutting his right eye views them with his left, it is very remarkable that the paper B, whoſe pencil of rays falls upon the inſertion D of the optic nerve D E, will immediately vaniſh or diſappear, while the two extreme papers C and A are viſible; and by altering the poſition of the eye, and its diſtance, any of the papers may be made to vaniſh, by cauſing the pencil of rays to fall on the point D. Why the rays of light ſhould not excite the ſenſa-

tion of vision in the point D, where the fibres of the nerves begin to separate and expand every way to form the retina, is not easy to say. But it is worth notice, that the nerve D E is for that reason placed on one side of the eye, where only the oblique rays come, the loss of which is not considerable, and no way affects or hinders the perfection of sight: whereas had it entered in the middle of the bottom of the eye, it had rendered useless all the direct rays, by which the most perfect and distinct vision is effected; and we could have had only a confused and imperfect conception of objects, by oblique collateral rays.

The laws of vision, brought under mathematical demonstration, make the subject of optics, taken in the greatest latitude of the word; which is commonly used, in a more restrained sense, for the doctrine of direct or simple vision, performed by rays passing directly, or in a straight line, from the object to the eye. The doctrine of reflected vision, or that performed by means of rays reflected from mirrors, makes the subject of catoptrics; and refracted vision, or that performed by rays refracted through glass lenses, or other mediums, constitutes that branch of optics, called dioptrics.

VISION, among divines, an appearance which God occasionally sent his prophets and saints, either by way of dream, or reality: such were the visions of Ezekiel, Amos, St. Paul, &c.

Beatific VISION, denotes the act whereby the angels and blessed spirits see God in Paradise.

VISITATION, in law, an act of jurisdiction, whereby a superior, or proper officer, visits some corporation, college, church, or other public or private house, to see that the laws and regulations thereof be duely observed.

Among us, visitation is that office performed by the bishop in every diocese once in three years, or by the archdeacon every year, by visiting the churches and their rectors throughout the whole diocese, &c.

VISUAL, in general, something belonging to vision. See the article VISION.

Thus, rays of light, coming from an object to the eye, are called visual rays; and the visual point in perspective is a point in the horizontal line, wherein all the visual rays unite.

VITAL, in physiology, is an appellation given to whatever ministers principally to the constituting of life in the bodies of animals: thus, the heart, lungs, and brain are called vital parts; and those operations of these parts, whereby the life of animals is maintained, are called vital functions. See the article FUNCTION.

VITEX, the chaste-tree, in botany, a genus of plants, whose flower is monopetalous and ringent; the tube is cylindric and slender, the limb is plane and bilabiated, the upper lip is trifid, and the lower one divided into three segments; the middle laciniæ of each is broadest: the fruit is a quadrilocular globose berry, each cell containing an ovate seed. See AGNUS CASTUS.

VITIS, the vine, in botany. See the article VINE.

VITIS IDÆA, in botany. See the article VACCINIUM.

VITREOUS *humour of the eye*, is so called from its resemblance to glass in fusion, being very like a fine clear jelly in appearance: it probably, says Heister, consists of extremely fine vesicles, containing a limpid and perfectly pellucid humour. It fills the posterior part of the eye, and is every where contiguous to the hinder part of the retina, which it serves also to expand. See EYE.

VITRIFICATION, in chemistry, is the converting a body into glass, by means of fire. See the article GLASS.

Of all bodies, fern-ashes, sand, pebbles, &c. vitrify the most readily; and accordingly, it is of these that glass is principally made.

VITRIOL, in natural history, a compounded body formed of the particles of metals dissolved by the acid of sulphur, and that either by the operations of nature, within the earth, or in the chemists elaboratory by proper admixtures and assistances, and afterwards, by the help of water, brought into the form of a salt.

The vitriols, therefore, very much approach the nature of metals, and, in some instances, are found to have taken up other substances, particularly, some of the semi-metals among them, as, the white vitriol, which contains zink. See the article ZINK.

The other metals we find dissolved in this manner in the bowels of the earth, and there formed into vitriols, are iron and copper. These, therefore, are the great basis of those salts; and according as they belong to one or the other of them, are to be divided into the cupreous and the ferrugineous vitriols.

The naturalist who collects for his amusement, will meet with vitriols containing these two metals, in various proportions, in the same mass. The blue green vitriol of Hungary and Transylvania, and many other of the fossils of this class are of that kind.

We shall here only consider those vitriols fit for the use of medicine: and, therefore, treat of the distinct and determinate vitriols which contain only the particles of one of these metals. Of these there are but three kinds, viz. 1. Green vitriol. 2. White vitriol. 3. Blue vitriol. To these, however, we are to subjoin the vitriolic minerals, misy, sory, melantina, &c. which are all of them, properly, the ores of vitriols. See the articles MISY, SORY, &c.

1. Green vitriol has iron wholly for its basis. It is formed solely of that metal, dissolved by the acid of sulphur, and by means of water reduced to the form of salt. It is of two kinds, natural and factitious; the natural or native kind is known by the

the name of green vitriol; the common appellation of the other is copperas. See the article COPPERAS.

It is a tolerable pure and pellucid ſalt, of a compact and regular texture, conſiderably heavy, but friable, and eaſily ſhattering to pieces on the ſmalleſt blow. It is of a fine, pale, graſs-green colour: it will not melt, or wholly run to water in a damp air, but it is very apt to be moiſt on the ſurface; it very readily diſſolves in water, and after evaporation, freely ſhoots again into regular cryſtals, the true figure of which is a regular rhomboid; but they are ſeldom perfect or regular. Expoſed to the fire, it becomes thin like water, boiling and bubbling up, and emitting a very thick fume. After this it grows thicker, and, finally, calcines to a grey powder; and from this, if the fire be continued and made more violent, to a fine purple matter, called calcothar of vitriol.

In England, where the greateſt quantity of this vitriol is made, it is formed from the common greeniſh pyrites, with the addition of old iron. The people who collect theſe pyrites, are not at the pains of ſearching it among the ſtrata, but they pick it up on the ſea coaſts of Eſſex, and other places, under cliffs, compoſed of ſtrata of clay, out of which the ſea waſhes it, and leaves it on the ſhore. This pyrites they expoſe to the air in vaſt heaps, and, in conſequence of that, it by degrees begins to ſwell and burſt, and ſhoot out in ſalts. They pile up theſe heaps in a kind of pits lined with clay, now and then turning them when their ſalt begins to appear in a downy efflorescence on the ſurfaces of the pieces they fall into, on breaking; the time of making vitriol being near.

Theſe efflorescences diſſolve by the rains and dews, and are, in fine, converted into an acrid liquor, which is conveyed from the bottom of the pits into leaden boilers, into which a quantity of old iron is alſo thrown; the fire is made under theſe, and the liquor is kept boiling for three days, or more, and is all the time ſupplied with freſh parcels of iron, ſo long as it will act upon them. The old iron, picked up by the poor people about our ſtreets, is ſold to the vitriol or copperas makers with this intent. When the liquor is boiled to a proper conſiſtence, it is let out into large coolers, in which there are ſticks placed acroſs, to which, as well as to the ſides of the veſſel, the vitriol adheres in large cryſtals, of the form and texture above deſcribed.

This ſalt, on a chemical analyſis, affords a very ſtrong acid ſpirit; or, as it is uſually, though very improperly, called, oil, which is a ſolvent for many of the metals, and effervesces very violently with an alkali, and even with ſpirit of wine, or common water. Mixed with ſal armoniac, it ferments violently, but the fermentation is attended with great coldneſs, inſtead of the heat uſual on theſe occaſions; and what is very ſingular is, that, while the fermenting mixture itſelf is thus cold, the vapour that ariſes from it is evidently hot to the hand. After the diſtillation of this acid liquor of vitriol, what remains in the retort is a red earth called colcothar; it contains iron, and is a ſtrong aſtringent.

In medicine, this ſpirit is given internally in fevers and hæmorrhages, and particularly in malignant fevers of the petechial kind; to be taken in all the drink, in ſuch quantity as to give an agreeable acidity to it.

Vitriolated tartar is another very valuable medicine, prepared from green vitriols, which attenuates the humours, reſiſts putrefaction, and opens obſtructions of the viſcera. See TARTAR.

2. White vitriol is a true and genuine, though not a pure, vitriol of iron; the colour of which, that has ſo long perplexed the world to account for, is at length found to be owing to a mixture of zink in it.

The white vitriol, uſed in the ſhops, is all prepared from the native ſalt of the ſame name and colour, by ſolution and evaporation. It is a ſafe, gentle, and expeditious vomit; being given in ſolution, from ten grains to a ſcruple, or more: it is alſo uſed externally in collyriums, intended againſt inflammations of the eyes; and is a very powerful ſtyptic in injections, to ſtop the gleet that ſometimes remains after the cure of a gonorrhœa. See the article GONORRHOEA.

3. Blue vitriol is a vitriol which has copper for its baſis. It is only met with ſuſpended in the waters of certain ſprings, from which it is obtained by means of evaporation and cryſtallization. The water of ſuch ſprings as are found ſtrongly enough impregnated with copper to be worth the working for vitriol, is ſaved in reſervoirs, and evaporated to a proper ſtandard; after which, it is let out into coolers, where it ſhoots into the beautiful cryſtals we ſee; which have the ſame qualities with the water, and on ſolution in common water, they make a ziment-water, not to be diſtinguiſhed from the native kind.

Blue vitriol is not given internally; but is of great uſe in external applications.

The blue vitriolic water of the ſhops, is made by diſſolving three ounces of blue vitriol, and two ounces of alum, in a pint and a half of boiling water; and afterwards add two ounces of ſtrong ſpirit of oil of vitriol, filtring the whole for uſe. It is an excellent ſtyptic, and particularly ſerviceable in hæmorrhages of the noſe. ſee the article HÆMORRHAGE.

VITRIOLATED, among chemiſts, ſomething that has vitriol infuſed in it.

VITRIOLIC, an appellation given to whatever abounds with, or partakes of, the nature of vitriol: thus ſuch foſſil bodies as contain vitriol, are called vitriolic

vitriolic minerals, or ores of vitriol; as the pyrites, chalcitis, misy, sory, melanteria, marcasites, &c.

VITUS's DANCE, *chorea sancti viti*, in medicine, a sort of convulsion, which boys and girls are subject to, from the age of ten years, to the time of puberty: it discovers itself first by a kind of lameness, or an instability of one of the legs, which they draw after them in a ridiculous manner; nor can they hold the arm of the same side still for a moment; and before they can bring a cup to their mouth, they use a thousand odd gesticulations. In a convulsive paroxysm, the limbs are strongly agitated; the hands are sometimes put behind them, and soon after they seem to be beating the air; and their legs will be drawn hither and thither, as if they were dancing some antic dance. See the articles CONVULSION and SPASM.

Dr. Mead thinks this disorder to be rather paralytic than convulsive, and that it may be cured by use of cold baths, and chalybeate medicines. Sydenham's method of cure is this: first take off seven or eight ounces of blood, more or less according to the strength of the patient, from the arm; and the next day, let the patient take a gentle purge of rhubarb, sena, manna, &c. In the evening of the same day, let him take a draught, with a scruple of Venice-treacle, and eight drops of liquid laudanum mixed in honey and milk-water. This purging and opiate draught is to be repeated at some days distance; the bleeding is also to be repeated to the fourth time; and in the intermediate days, a cordial and nervous electuary is to be given, composed of the conserves of rosemary, orange-peel, and Roman-wormwood, with Venice-treacle, candied nutmeg, and candied ginger; of this, the bigness of a nutmeg may be given every morning and afternoon, drinking after it a decoction of piony, master-wort, and elecampane, and angelica-roots, the leaves of rue, sage, betony, and other cephalic plants, with orange peel and Juniper berries. Spirit of harts-horn may also be given every night in small doses, in a nervous julep, and plasters of gum-caranna may be applied to the soles of the feet. According as the cure advances, the patient recovers the use of his hand and foot; and his amendment may always be discovered by letting him attempt to bring a glass of any liquor to his mouth in a strait line: though the bleeding should not be repeated beyond the fourth time, yet the alterative and purging medicines should be continued till the patient is quite well; and as people are subject to relapses in this disorder, it is proper to give the same medicines, and to bleed at the return of that season of the year.

VIVA VOCE, a Latin phrase frequently used in English writers, and literally signifying by word of mouth.

VIVIFICATION, in medicine, the art of vivifying; that is of contributing to the action that gives life or maintains life.

VIVIPAROUS, *Viviparus*, in natural history, an epithet applied to such animals as bring forth their young alive and perfect, in contradistinction to them that lay eggs, which are called oviparous animals.

The females of all the quadruped class are viviparous, and those of the bird-class are all oviparous. The laws of nature in the larger animals, are therefore, in a great measure, fixed and certain; but it is not so in the insect tribes, nor in the fishes; for of these some are viviparous, and others oviparous; and those of genera nearly allied to one another. Among insects, the much greater number are oviperous; but there are many which are not so, as the pucerons, progallinsects, chochineal, &c.

The millepedes and scorpions are also well known to be so; all the females of the butterfly, and of some other classes, lay only eggs: but the most singular and remarkable inconstancy in nature, if we may be allowed the expression, is that in the fly-kingdom; the same class of insects, and even the same genus, will furnish us with some which are viviparous, and others which are oviparous; the two winged flies give us instances of this: but these are not single in that respect; for among the reptile world, there are other creatures which are subject to the same varieties; and Swammerdam has observed a viviparous snail. The two winged viviparous flies bring forth worms in all respects the same with those hatched from their eggs in the other species.

VIVO, in architecture, the shaft or fust of a column.

The term is also used in a more particular sense for the naked of a column, or other part.

ULCER, *Ulcus*, in surgery, is a solution of the soft parts of our bodies, together with the skin, produced by some internal cause, as an inflammation, abscess, or acrimonious humours. But wounds which become inveterate, and even contusions, when difficult of cure, come within this definition, and pass, at length, into ulcers, and are commonly so called. See ABSCESS.

The proper and usual seat of an ulcer, then, is in any of the softer parts of the body, as the skin, fat, glands, flesh, and internal viscera. For if there be any exulceration or corrosion in the harder parts, as the bones, it comes rather under the notion of a caries, or what is commonly called spina ventosa, than that of an ulcer; though, on account of some kind of resembance which it has with the ulcer, or erosion, of the softer parts, they are sometimes treated of in conjunction. See the article CARIES, &c.

Ulcers can by no means be reckoned all of one

kind, but are diſtinguiſhed into various ſpecies, on many accounts; as, 1. with reſpect to the different parts of the body in which they are ſeated; for, ſometimes they infeſt the ſkin, at other times the fat, and ſometimes the glands and fleſh. 2. As to their magnitude; for ſome ulcers are large and extended, others ſmall, and contracted within narrow limits; ſome deep, others ſhallow and more ſuperficial; in particular, ulcers of a conſiderable depth, but narrower, and more eſpecially diſtinguiſhed by the narrowneſs of their orifice or beginning, uſually paſs under the peculiar denomination ſinus or fiſtula. Ulcers differ, 3. With regard to duration; for ſome are recent, others inveterate. 4. On account of their attendant ſymptoms; in which reſpect ſome ulcers are mild and favourable, others malignant, that is, attended with very acute pains, or fœtid, putrid, pinguious, rheumy, or diſcharging much ichor, creeping or ſpreading, cancerous, or inclining to a cancer, callous, fiſtulous, or verminous; there is a difference between them. 5. With reſpect to their cauſes, in which light they aſſume the epithets of ſcorbutic, venereal, carious, cancerous, peſtilential, and ſuch as are ſuppoſed to proceed from faſcination. In the laſt place, ulcers are diſtinguiſhed by the parts in which they are ſeated. Thus, ſome infeſt the noſtrils, others the fauces, palate, breaſts, and anus; and one ſort has the name of fiſtula lacrymalis. See the articles SINUS, FISTULA, &c.

The method of cure in ulcers is extremely various, as adapted to the great variety of the diſeaſe; for when the ulcer is but recent, it is to be healed in the ſame manner as a recent wound or abſceſs. We muſt firſt, then, begin with mundification, or cleanſing the ulcer; after that proceed to incarn, or fill the cavity with new fleſh; and, laſtly, cover and conglutinate the ſame as much as poſſible, with a fair and even cicatrix.

Mundification of an ulcer is, according to Heiſter, uſually performed in the following manner: firſt, the corrupted matter is evacuated; or, when it diſcharges itſelf not ſo freely as it ought, gently expreſſed with the fingers; if there be a deep ſinus belonging to the ulcer, it is to be exterged by ſome proper injections; or, if the place be open enough, by repeating intromiſſions of freſh lint. If there be any pieces of membranes, or other corrupted pinguious parts, left in the ulcer, the beſt way to eject them is, at every dreſſing, to introduce into the place lint moiſtened with ſome digeſtive ointment, and cover it with a plaſter of diachylon, diapalma, or ſomething of the like nature; and upon that, apply compreſſes, and over the whole a bandage: this method is to be carefully followed till the place be thoroughly cleanſed, or till the bottom of the ulcer appears quite red, and covered with new fleſh.

After due mundification, the next buſineſs is to fill the ulcer with new fleſh, which is performed by the help of ſuch medicines as are commonly called ſarcotics.

The beſt and moſt effectual, by many degrees, is the digeſtive ointment; for without ſome extraordinary impediment, this digeſtive is, of itſelf, ſufficient to produce new fleſh. It is, indeed, the manner of almoſt all ſurgeons very gravely to recommend every one his proper balſamics for the procuring of new fleſh; but it is preſumed, there is no neceſſity for them to be ſo careful and ſolicitous in this point, ſince there is, in this very digeſtive, a balſamic virtue; and it ought, beſides, to be conſidered, that this new fleſh owes it generation, not ſo much to the aſſiſtance of medicines, as the benefit of nature: for all the care and diligence of the ſurgeon have ſcarce any other effect, than to remove all ſuch things as are hurtful, and may prove impediments to a cure. If any one, however, ſhould think this digeſtive ointment not ſtrong enough for his purpoſe, he may try balſam of arcæus, balſam of Peru, balſam of Mecca, balſam of ſulphur, eſſence of myrrh and aloes, oil of myrrh per deliquium, oil of eggs, and other vulnerary balſams of the like kind, which may be uſed in its ſtead; and, by the beſt means he can procure, to accompliſh a perfect conglutination.

When an ulcer has penetrated ſo deep as to have its bottom remote, not only from ſight, but from the reach of medicines, it may ſeem neceſſary in every dreſſing, after expreſſing the corrupted matter collected within, to make an injection of ſome cleanſing and healing liquor; ſuch as a decoction of agrimony and birthwort mixed with honey of roſes, or eſſence of myrrh and aloes, or what Belloſte, in his Hoſpital Surgeon, recommends, a decoction of walnut leaves mixed with ſugar before the place be bound up, till the bottom is conglutinated, and to continue the ſame till the ulcer is filled up. See VULNERARY.

The ulcer being, by ſome means or other, as may ſeem moſt adviſeable, incarned and filled up, the induction of a fit and decent cicatrix muſt be completed; but if by ſuch means you cannot prevent a luxuriancy of fleſh, with a moiſtneſs of the ulcer, it will be proper to ſprinkle on the part ſome drying powders, ſuch as thoſe of maſtic, frankincenſe, ſarcocolla, colophony, lapis calaminaris, and tutty; applying, afterwards, to the place dry lint, and a plaſter accommodated to retain and hold together all the things applied, continuing the ſame till the place be perfectly whole and ſound: but if the luxuriant and fungous fleſh has already elevated it-

ſelf above the reſt, the beſt way to conſume it, is to rub it with blue vitriol; or, if this be not ſtrong enough, to ſprinkle on it ſome powder of red precipitate and burnt alum, till its growth be entirely ſuppreſſed, and nothing appears prominent.

In the laſt place, it is hardly to be expreſſed how much a prudent regimen in diet and manner of living contributes towards the incarning and conglutination of ulcers: for it has been an old obſervation of the profeſſors of the ſalutary art, that very bad ulcers have been cured by means of a regimen, without any conſiderable aſſiſtance from medicine; and, on the contrary, that the ſlighteſt and moſt contemptible ſores have, by a neglect of the rules of diet, and prepoſterous way of living, degenerated into very bad, and even incurable, ulcers.

Great care, therefore, is to be taken by every perſon troubled with an ulcer, to avoid ſalt, acrid, and acid food, and ſuch as is too fat or heating, with ſwine's fleſh, and all ſuch as is difficult of concoction. If a bad habit of body be an impediment to the cure of an ulcer, the advice of a ſkilful phyſician is required, who, by the preſcription of proper internal medicines, may not only prevent an ulcer of a mild and favourable kind from becoming malignant, and perhaps incurable, but as much as poſſible promote and haſten its cure.

In callous and fiſtulous ulcers, that have formed variety of ſinuſes, and when either nothing can be done by corroſive medicines, or elſe that they tear and corrode the nerves, and bring on convulſions, and other bad ſymptoms, before they effect the callus; in theſe caſes, the beſt and ſafeſt way is to lay open the ſinus, taking care not to wound the nerves, tendons and arteries. and, after that, all the calluſes may be eaſily deſtroyed by the common methods. Or, if even this method ſhould not have the deſired effect, and if the patient has a conſiderable ſhare both of ſtrength and courage, and the ſituation of the nerves and arteries is favourable, the callous parts muſt be all entirely cut out with the knife, or burned away by the actual cautery. See the article CALLUS.

When ulcers are attended with a large diſcharge, the acrimonious ſerum, wherewith the blood abounds, ſhould be evacuated by cathartic and diuretic medicines. Millepedes, in any form, are very properly preſcribed to be taken internally in theſe, as are alſo eſſence of amber, myrrh, balſam of Peru, tincture of ſalt of tartar, tartarized tincture of antimony, and the like: large and frequent draughts of ſmall liquors are frequently the cauſe of theſe diſorders, and are therefore moſt carefully to be avoided; ſtrong ale, or old wine, ſhould be drank ſparingly at meals, and nothing between them. Such meats are beſt, on theſe occaſions, as have feweſt juices in them, and are very well roaſted; and the external medicines muſt be thoſe which have the greateſt reputation as dryers. The principal of theſe are lime-water, lapis-calaminaris, tutty, chalk, maſtic, frankincenſe, colophony, and native cinnabar; and and when any of theſe have been ſprinkled in fine powder upon the ulcer, a plaſter of diapompholygos, or the like, is to be laid over it.

For the cleanſing venereal ulcers, Heiſter recommends the phagedenic water; or lime-water, impregnated with calomel: either of theſe may be applied often every day, and the parts may alſo, if neceſſary, be touched with a cauſtic; and when they are thoroughly cleanſed, they may very ſucceſsfully be healed, either with an ointment made only with crude mercury mixed with turpentine, or with the following: take of the diapompholygos ointment and crude mercury, killed with a ſmall quantity of Venice-tupentine, of each equal quantities; mix them in a glaſs mortar into an ointment: or, take of the amalgama of lead and tin an ounce, of bole armenic two ounces; mix theſe, and make them into an ointment, by mixing with them a ſufficient quantity of ointment of roſes, or any other ſimple ointment, in a glaſs mortar. If there be at the ſame time a caries of the bone, which is, indeed, too frequently the caſe, this is to be dreſſed with euphorbium, oil of cloves, phagedenic-water, or ſpirit of nitre with quick-ſilver diſſolved in it; or, if it can be conveniently and ſafely done, the actual cautery is of ſignal ſervice.

ULCERATION, or EXULCERATION, in ſurgery, a little hole in the ſkin, cauſed by an ulcer.

ULEX, the furze, or whin-buſh, in botany, a genus of plants, whoſe flower is pentapetalous and papilionaceous; the vexillum is almoſt heart-ſhaped, erect, large, and emarginated; the wings are ſhort and obtuſe, and the carina is dipetalous, obtuſe, and join at their bottoms; the fruit is an oblong turged pod, having one cell and two valves, containing a few roundiſh emarginated ſeeds.

The common furze is ſo well known as to require no deſcription; it may be raiſed from ſeeds, and will grow in any ſoil or ſituation, and is very uſeful for heating ovens, burning lime and bricks, and drying malt, where other fuel is ſcarce; it may be ſown in ſuch poor lands on which nothing elſe will grow, for the above purpoſes.

ULIGINOUS, in agriculture, an appellation given to a moiſt, mooriſh, and fenny ſoil.

ULLAGE, in gauging, is ſo much of a caſk, or other veſſel, as it wants of being full. See the article GAUGING.

ULMARIA, in botany, a ſpecies of filipendula. See the article FILIPENDULA.

ULMUS, the elm-tree, in botany. See the article ELM.

ULNA, in anatomy, one of the bones of the fore-arm, reaching from the elbow to the wriſt: it is big at its upper extremity, and grows gradually ſmaller towards its lower end. See the article SKELETON.

This

This bone is longer than the radius, and has a motion of flexion and extenſion: at its upper extremity, it articulates with the os humeri and the criſta of the radius; and its lower extremity articulates with the carpus, as alſo with the radius by means of a criſis.

ULNA, an ell. See the article ELL and MEASURE.

ULNARIS, in anatomy, the name of two muſcles of the carpus, or hand; one called ulnaris internus, which is a flexor muſcle terminating in the internal officle of the carpus; and the other, called ulnaris externus, is an extenſor muſcle, terminating in the metacarpal bone that ſupports the little finger.

ULTERIOR, in geography, is applied to ſome part of a country or province, which, with regard to the reſt of that country, is ſituated on the farther ſide of the river, mountain, or other boundary, which divides the country into two parts. Thus Africa, with regard to Europe, is divided, by mount Atlas, into citerior and ulterior, i. e. into two portions, the one on this ſide mount Atlas, and the other on that.

ULTRAMARINE, *Ultramarinum*, a beautiful blue colour uſed by the painters, prepared from lapis lazuli, by calcination. See LAZULI.

The German lapis lazuli does not anſwer well in this proceſs, and diſcovers itſelf by its calcining eaſier than the African or Aſiatic, and turning greeniſh. The oriental kind calcines to a finer blue than it naturally has, and retains the colour for ever.

After calcining the ſtone in a clear fire of charcoal, they grind it to an impalpable powder on a porphyry, and then mixing it up in a paſte, compoſed of pitch, wax, and oil, they work it about with the hands; and, finally, kneading this in a veſſel of clear water, as the powder ſeparates from the viſcid matter, it ſinks to the bottom: when all that is perfectly fine in this, is worked out, they let the water be drained off, and dry the powder for uſe. What remains embodied in the paſte, is afterwards ſeparated, and makes a worſe kind than the former; though even the very meaneſt ultramarine is a very beautiful colour.

Ultramarine muſt be choſen of a high colour, and well ground, which may be known by putting it between the teeth, and if it feel gritty, it is a ſign it has not been well ground.

To know whether it be pure and unmixed, put a little of it into a crucible, and heat it red hot; and if the powder has not changed its colour after this trial, it is certainly pure; on the contrary, if there be any change, or any black ſpecks in it, then it has been adulterated.

There is alſo a ſpurious ſort, called common or Dutch ultramarine; which is only ſmalt well ground and pulverized. See SMALT.

ULTRAMONTANE, ſomething beyond the mountains. The term is principally uſed in relation to Italy and France, which are ſeparated by the mountains of the Alps.

ULTRAMUNDANE, *Ultramundanus*, beyond the world; is that part of the univerſe ſuppoſed to be without, or beyond, the limits of our world, or ſyſtem.

ULVA, in botany, a genus of water-plants, belonging to the cryptogamia claſs; the fructifications of which are diſpoſed in membraneous bladders, without the leaf.

UMBEL, *Umbella*, among botaniſts, is the extremity of a ſtalk or branch divided into ſeveral pedunclcs, or rays, beginning from the ſame point, and opening in ſuch a manner as to form an inverted cone: theſe are either ſimple or compound; a ſimple umbel, is when the receptacle is but once divided into footſtalks; but, a compound umbel, is when all the common footſtalks are ſubdivided into umbellulæ, or little umbels. They are of different figures; as plane, convex, concave, or radiated.

UMBELLIFEROUS PLANTS, are thoſe whoſe flowers are produced in an umbel, on the top of the ſtalks, ſomewhat repreſenting an umbrella.

All the plants of this kind belong to the pentandria claſs of Linnæus; the flower is pentapetalous, and ſucceeded by two naked ſeeds, joined together. Thoſe which grow wild in dry ſoils, are aromatic, warm, reſolvent, and carminative; but thoſe which grow in moiſt places are often poiſonous, the virtue is chiefly in the roots and ſeeds; ſuch are fennel, parſley, parſnips, carrots, hemlock, &c.

UMBER, or UMBRE, *Umbria*, among painters, &c. a kind of dry duſky-coloured earth, which, diluted with water, ſerves to make a dark brown colour, uſually called with us, a hair colour.

It is called umber, from *umbra*, a ſhadow, as ſerving chiefly for the ſhading of objects; or, rather, from Umbria, a country of Italy, whence it is uſed to be brought.

UMBILICAL, among anatomiſts, ſomething relating to the umbilicus, or navel. See the articles NAVEL and ABDOMEN.

UMBILICAL POINTS, in mathematics, the ſame with foci. See FOCUS.

UMBILICUS, the navel, in anatomy. See the article NAVEL.

UMBONE, a name uſed by ſome for the ſtyle or piſtil of a flower. See the articles FLOWER, PISTIL, &c.

UMBRA, or SHADOW. See the article SHADOW.

UMBRE, or UMBER, among painters. See the article UMBER.

UMBRELLA-TREE, in botany, a curious ſpecies of magnolia. It grows in Carolina to the height of ſixteen or eighteen feet; the trunk is ſlender, and the wood is ſoft and ſpongy; the leaves are large.

large, deciduous, and produced in horizontal circles, reſembling an umbrella; whence the name: the flowers are compoſed of ten or eleven white petals, which hang down, and are afterwards ſucceeded by ſcarlet fruit, of the ſame form with the other ſpecies of magnolia, and is increaſed from ſeeds in the ſame manner. See MAGNOLIA.

UMPIRE, a third perſon choſen to decide a controverſy left to arbitration. See the article ARBITRATION.

UNCIÆ, in algebra, the numbers prefixed before the letters of the members of any power produced from a binomial, reſidual, or multinomial root.

Thus, in the fourth power of $a+b$, viz. $a^4+4a^3b+6a^2b^2+4ab^3+b^4$, the unciæ are 4, 6, 4; being the ſame with what others call co-efficients. See BINOMIAL, CO-EFFICIENT, and INVOLUTION.

UNCTION, *Unctio*, the act of anointing or rubbing with oil, or other fatty matter.

The cure of divers wounds, ulcers, &c. greatly depend upon repeated unctions with oil, unguents, cerats, &c. For the mercurial unction applied to bring on a ſalivation, ſee SALIVATION.

UNCTION, in matters of religion, is uſed for the character conferred on ſacred things, by anointing them with oil.

Unctions were very frequent among the Hebrews. They anointed both their kings and high-prieſts at the ceremony of their inauguration. See INAUGURATION.

They alſo anointed their ſacred veſſels of the tabernacle and temple, to ſanctify and conſecrate them to the ſervice of God. The unction of kings is ſuppoſed to be a ceremony introduced very late among the Chriſtian princes. It is ſaid, that none of the emperors were ever anointed before Juſtinian, or Juſtin. The emperors of Germany took the practice from thoſe of the eaſtern empire: king Pepin of France was the firſt who received the unctions. In the ancient Chriſtian church, unction always accompanied the ceremonies of baptiſm and confirmation.

Extreme unction, or the anointing perſons in the agony of death, was alſo practiſed by the ancient Chriſtians, in compliance with the precept of St. James, chap. v. ver. 14, 15; and this extreme unction the Romiſh church has advanced to the dignity of a ſacrament. It is adminiſtered to none but ſuch as are afflicted with ſome mortal diſeaſe, or are in a decrepit age. It is refuſed to impenitent perſons, as alſo to criminals. The parts to be anointed are the eyes, the ears, the noſtrils, the mouth, the hands, the feet, and the reins. The laity are anointed in the palms of the hands, but prieſts on the back of it; becauſe the palms of their hands have been already conſecrated by ordination. The parts above-mentioned, are anointed in the form of a croſs. The prieſt begins anointing the ſick perſon's eyes, ſaying, "May God, by this holy anointing, pardon you the ſins you have committed by the eyes." In like manner he proceeds to the other parts, varying the words according to the parts he anoints.

UNCUTH, unknown, is uſed, in the ancient Saxon laws, for him that comes to an inn gueſtwiſe, and lies there but one night; in which caſe, his hoſt is not bound to anſwer for any offence he committed, whereof he was guiltleſs himſelf. See HOGENHINE.

UNDECAGON, is a regular polygon, of eleven ſides. See POLYGON.

UNDECEMVIR, a magiſtrate among the ancient Athenians, who had ten other collegues or aſſociates joined with him in the ſame commiſſion.

UNDE', undee, or undy. See WAVY.

UNDER *the Sea*, in the ſea language. A ſhip is ſaid to be ſo when ſhe lies ſtill, or waits for ſome other ſhips, with her helm laſhed, or tied up a-lee.

UNDER-CURRENTS, currents diſtinct from the upper or apparent currents of the ſeas.

Some naturaliſts conclude, that there are, in divers places, under-currents, which ſet or drive a contrary way from the upper current; whence they ſolve the remarkable phænomena of the ſea's ſetting ſtrongly through the Streights into the Mediterranean, with a conſtant current twenty leagues broad; as alſo, that running from the Euxine through the Boſphorus into the Helleſpont, and thence into the Archipelago: they conjecture, that there is an under-current, whereby as great a quantity of water is carried out as comes in.

To confirm this, it is obtained, that between the north and ſouth Foreland, it is either high or low water upon the ſhore three hours before it is ſo off at ſea; a certain ſign, that though the tide of flood runs aloft, yet the tide of ebb runs under foot, or cloſe by the ground. Yet Dr. Halley ſolves the currents ſetting in at the Streights without overflowing the banks, from the great evaporation, without ſuppoſing any under-current. See the article SEA.

UNDERMINING, or SAPPING. See the article SAPPING.

UNDERSTANDING, *intellectus*, is defined by the peripatetics to be a faculty of the reaſonable ſoul, converſant about intelligible things, conſidered as intelligible. They alſo make it twofold, viz. active and paſſive. Active underſtanding, they hold that faculty of the ſoul by which the ſpecies and images of intelligible things are framed, on occaſion of the preſence of phantaſms or appearances thereof. For maintaining the intellect to be material, they hold it impoſſible it ſhould be diſpoſed to think by any diſproportionable phantaſms of mere body, and there-

therefore that it is obliged to frame other proportionate ſpecies of itſelf, and hence its denomination active.

Paſſive underſtanding, is that which receiving the ſpecies framed by the active underſtanding, breaks forth into actual knowledge. See the article KNOWLEDGE.

The moderns ſet aſide the peripatetic notion of an active underſtanding. The Carteſians define the underſtanding to be that faculty whereby the mind converſing with, and, as it were, intent on itſelf, evidently knows what is true in any thing not exceeding its capacity. The corpuſcular philoſophers define the underſtanding to be a faculty expreſſive of things which ſtrike on the external ſenſes, either by their images or their effects, and ſo enter the mind. Their doctrine is, *nihil eſſe in intellectu quod non prius fuerit in ſenſu*; and to this doctrine Mr. Locke, and moſt of the lateſt Engliſh philoſophers, ſubſcribe. See IDEA.

Between the Carteſians and corpuſcularians there is this farther difference, that the latter make the judgment to belong to the underſtanding, but the former to the will. Hence, according to the moſt approved opinion of the corpuſcularians, the underſtanding has two offices, viz. perception and judgment; according to the Carteſians, it has only one, viz. perception. See the articles PERCEPTION, JUDGMENT, and WILL.

UNDERSTANDING is alſo uſed for the act, exerciſe, or exertion, of this faculty, or the action whereby the mind knows things, or repreſents them in idea to itſelf.

UNDERWOOD, *Sub-boſcus*, is coppice, or any wood that is not accounted timber. See the articles COPPICE and TIMBER.

In the cutting the underwood of coppices, when the ſtubbles are great, they ſhould be ſtubbed up; for they only take up a great deal of room, and ſend up few ſhoots, their cracks and holes letting in water, and uſually half killing them. The taking up theſe ſhould be performed in winter, and the ſpaces they leave will be occupied by young trees: if not, a long branch of ſome neighbouring tree may be laid down, which will ſoon ſend up a ſufficient ſupply of ſuckers for the place. In felling the underwood, it is always proper to leave young trees enough, the worſt of which may be taken down the next fall, eſpecially if any of them grow near a great tree that will be fit to fell the next ſeaſon, becauſe they may be ſpoiled by its fall.

UNDULATION, in phyſics, a kind of tremulous motion or vibration obſervable in a liquid, whereby it alternately riſes and falls like the waves of the ſea.

This undulatory motion, if the liquid be ſmooth and at reſt, is propagated in concentric circles, as moſt people have obſerved upon throwing a ſtone, or other matter, upon the ſurface of a ſtagnant water, or even upon touching the ſurface of the water lightly with the finger, or the like. The reaſon of theſe circular undulations is, that by touching the ſurface with your finger, there is produced a depreſſion of the water in the place of contact. By this depreſſion, the ſubjacent parts are moved ſucceſſively out of their place, and the other adjacent parts thruſt upwards, which lying ſucceſſively on the deſcending liquid, follow it; and thus the parts of the liquid are alternately raiſed and depreſſed, and that circularly. When a ſtone is thrown into the liquid, the reciprocal vibrations are more conſpicuous: here the water, in the place of immerſion, riſing higher by means of the impulſe, or rebound, till it comes to fall again, gives an impulſe to the adjoining liquid, by which means that is likewiſe raiſed about the place of the ſtone as about a center, and forms the firſt undulous circle; this falling again, gives another impulſe to the fluid next to it, farther from the center, which riſes likewiſe in a circle; and thus ſucceſſively greater and greater circles are produced.

Undulatory motion is likewiſe applied to a motion in the air, whereby its parts are agitated after the like manner as waves in the ſea; as is ſuppoſed to be the caſe when the ſtring of a muſical inſtrument is ſtruck. This undulatory motion of the air is ſuppoſed the matter or cauſe of ſound.

UNGELD, in our antient cuſtoms, a perſon out of the protection of the law; ſo that if he were murdered, no geld or fine was to be paid, in the way of compenſation, by him that killed him.

UNGUENT, or OINTMENT, *Unguentum*, in medicine and ſurgery, a topical remedy or compoſition, chiefly uſed in the dreſſing of wounds and ulcers.

Unguents are divided into ſimple aud compound, though it ſo happens that ſome of the former are conſiderably compounded; and amongſt the latter there are ſome ſimple unguents, and others very little compounded. Unguents, liniments, and cerates, are external forms applied on divers parts of the body, both to cure, to eaſe, and to relieve them. Theſe only differ from each other in their conſiſtence; with regard to which, unguents hold the medium, being ſtiffer than liniments, but ſofter than cerates. Oils are the baſes of all the three, to which are added wax axungia, and ſeveral parts of plants, animals, and minerals, both on account of the virtues they furniſh, and to give a conſiſtence to the oils, and to keep them longer on the part, that they may have more time to act. See CERATE and LINIMENT.

Any of the officinal plaſters, diluted with ſo much oil as will reduce it to the thickneſs of ſtiff honey, forms an ointment; by further increaſing the oil it becomes a liniment.

There are ſome conſiderable compoſitions of this form in the intention of emollients: and amongſt the

the compound unguents there are ſome which take in a number of very warm aromatic ingredients, and ſeem deſigned for paralytic infirmities, and caſes that require briſk attenuating applications. At the head of the emollient unguents, is the unguentum dialthææ; and among the attenuating ones, the moſt in eſteem is the unguentum martiatum and nervinum. There are ointments alſo within the intention of ſtrengtheners: and the next intention of any conſequence for which we are provided by this form, and which ſeems as ſuitable to it as any, is againſt cutaneous foulneſſes, as the itch, and ſuch like diſtempers; and this ſeems to be the reaſon that there is ſuch a choice of them now given. But though moſt of theſe have the reputation of great antiquity, and hold their places in abundance of officinal diſpenſatories down to the preſent, yet they are ſo uncleanly in uſe, that they are almoſt altogether fallen into neglect, unleſs in ſome of our hoſpitals; thoſe which contain mercury being much more neat and efficacious for the ſame purpoſe.

Some other things of this diviſion are little elſe than oils wrought into ointments, by the exchange of oil for lard. Pomatums are alſo ranked among the number of unguents. See POMATUM.

UNGUIS, a Latin term, ſignifying a nail of the hand or foot. See NAIL.

UNGUIS, PANNUS, or PTERYGIUM, in medicine and ſurgery, a preternatural membrane formed upon the coats of the eye, ſo as to extend itſelf over the cornea and pupil, and obſtruct the ſight.

An unguis of the eye happens when the blood-veſſels of the tendinous tunic in the corners of the eyes are turgid with blood, through an obſtruction or inflammation. When this diſtemper increaſes, there is a ſort of carnous web which covers the eye in whole or in part, inſomuch that the eyes are offended with the light, and look red ſometimes: the web is thin and white, ſometimes thicker and more fleſhy, rough, obſcure, and painful; nay, ſometimes it becomes cancerous, which is incurable, and ought not to be touched.

In the cure, this preternatural coat is to be removed, or taken off, by abſtergent and gently corroding medicines, or by the hand of a ſurgeon. The medicines in uſe are ſugar-candy, honey, white-wine, bone of the cuttle-fiſh, burnt hartſhorn, and calcined egg-ſhells; as alſo water of eye-bright, the great celandine, and the fennel, in which crocus metallorum may be infuſed: particularly the gall of pike diſſolved in a proper water; that is, two ounces to one of the gall. Some recommend a water diſtilled from the dung of young geeſe in April.

If the diſorder be obſtinate, the juice of the greater celandine may be uſed diluted in fennel-water. The following collyrium is proper: Take of prepared lapis hæmatitis, half a ſcruple; of white vitriol, twenty-five grains; of myrrh and ſaffron, each five grains; of white-ſugar candied, one ſcruple. Reduce this mixture to a powder, and then mix it with equal parts of waters of roſes, eye-bright, and fennel, and apply it to the eye with a feather, taking care not to injure the pupil.

UNGUIS, in anatomy, is applied to two bones of the noſe, being as thin as ſcales, and reſembling the nail; whence their name. The unguis are the ſmalleſt bones in the upper jaw, and are ſituated near the great canthus of the eyes. Some authors call them oſſa lacrymalis; others, orbitaria-oſſa. They are contiguous to four other bones, viz. the coronal; that of the noſe; the maxillary; and that part of the ethmoides which forms the orbit.

UNGUIS, among botaniſts, the narrow part of a petal, which is inſerted in the receptacle, and is generally hid by the cup; the broader part towards the end is called bractea; ſuch are the petals of carnations, &c.

UNGUIS ODORATUS, the nail-like ſweet ſhell, in pharmacy, a medicine famous among the ancients; but has, for a long time, been out of credit: and the conſequence of the neglect that has been ſhewn it is the loſing its real hiſtory, and the miſtaking different ſubſtances of the ſame origin and nature, though the produce of different animals, for it.

UNGULA, in geometry, the ſection of a cylinder cut off by a plane paſſing obliquely through the plane of the baſe and part of the cylindric ſurface.

UNGULA, in natural hiſtory, the claw or hoof of a quadruped.

UNICORN, μονοκερως, an animal, famous among the ancients, but looked on by the moderns as fabulous, denominated from its diſtinguiſhing characteriſtic of having one horn only, which is repreſented as five palms long, and growing in the middle of the forehead. It is ſaid to be about the ſize of an horſe: its hair ſhort, and of a darkiſh brown colour, very timorous, and therefore keeping moſtly in the woods. Some will have it an amphibious animal, and its horn moveable at pleaſure. Others make all its ſtrength to conſiſt in its horn; and add, that when purſued by the hunters, it precipitates itſelf from the top of the higheſt rocks, and pitches upon its horn, which ſuſtains the whole effort of its fall, ſo that it receives no damage thereby. It is added, that it is wonderfully fond of chaſte perſons; and therefore, in order to take it, a virgin is placed in its way, whom, when the unicorn ſpies, he lies down by her, lays his head in her lap, and falls aſleep; upon which, the virgin making a ſignal, the hunters come in and take the beaſt; which could never be caught by any other means, becauſe it would either caſt itſelf from a rock or die.

UNICORN-FISH, in ichthyology, a ſpecies of the monodon, or narwal, an extremely ſingular fiſh; the length of a full-grown one being about twenty-

five

five feet, but commonly from ſixteen to twenty: it has only one tooth, remarkably long, which is fixed in the upper jaw, and runs parallel with the length of the fiſh, ſo that it has more the appearance of a horn than a tooth.

The diameter of this fiſh equals at leaſt half its length, whence it is very unwealdy: the head is ſmall, and ſhaped like that of a roach: there is no fin on the back; and the fiſtule is in the vertex or uppermoſt part of the head. The tooth grows to ten feet or more in length, is about the thickneſs of a man's wriſt towards the baſe, and thence becomes gradually ſmaller all the way to the point.

UNICORNU, FOSSILE, *Foſſil Unicorn's Horn*, the name of a ſubſtance much uſed in medicine in ſome parts of the world, and, which ſeems to have been very little underſtood by many who have written of it; but is now determined to be no other than a terrene cruſtaceous ſpar, not very different from the oſteocolla, and other bodies of that genus called the cibdeloplacium.

It is eſteemed as a ſudorific and aſtringent, and is given in fevers attended with diarrhœas, with great ſucceſs. See the articles CIBDELOPLACIA and OSTEOCOLLA.

UNIFORM, denotes a thing to be ſimilar, or conſiſtent, either with another thing or with itſelf, in reſpect of figure, ſtructure, proportion, and the like; in which ſenſe it ſtands oppoſed to difform. See the article DIFFORM.

Thus the uniform flowers of plants, are ſuch as are of the ſame figure all around, having their fore and back parts, as alſo their right and left parts, exactly alike.

UNIFORM MOTION, &c. See the articles MOTION and EQUABLE.

UNIFORMITY, a ſimilitude, or reſemblance, between the parts of a whole; ſuch is that we meet with in figures of many ſides and angles reſpectively equal, and anſwerable to each other.

UNIOLA, in botany, a genus of plants, whoſe flower conſiſts of a bivalvular glume, or huſk; each valve is of a lanceolato-compreſſed figure, like thoſe of the cup; the inner valve appears ſomewhat higher than the outer one: the ſtamina are three capillary filaments, topped with oblong linear antheræ: there is no pericarpium, but the corolla incloſes the ſeed, which is ſingle, and of an ovato-oblong figure.

UNION, a junction, coalition, or aſſemblage of two or more different things in one.

UNION, among painters, expreſſes a ſymmetry and agreement between the ſeveral parts of a painting; e. g. when there is a great deal of relation and connection between them, both as to the figuring and colouring; ſo that they apparently conſpire to form one thing.

UNION, in an eccleſiaſtical ſenſe, denotes a combining or conſolidating of two churches into one: There are two kinds of this union, as when one church is made ſubject to another, and one parſon is made rector of both; and where a conventual church is made a cathedral.

In caſe two churches were ſo ſmall as that the tythes did not make a competent proviſion for each of the parſons, they might be united at common law before any act of parliament was made for that purpoſe.

By ſtatute, there may be an union of two churches where they lie not above a mile diſtant from each other, and where the value of the one exceeds not ſix pounds a year in the king's books of firſt fruits; which is done by the conſent of the biſhop, the patron, and incumbent.

Alſo, in cities or corporate towns, it is ordained, that the biſhop, the patron, and the mayors, or chief magiſtrate of the place, &c. may unite pariſh-churches therein: yet, when the income of the church is above one hundred pounds per ann. there the major part of the pariſhioners are to agree to the ſame; and after the union, the patrons of thoſe churches are to preſent by turns, &c. but, notwithſtanding, each of the pariſhes continue diſtinct as to rates, charges, &c.

UNION, or the UNION, by way of eminence, is more particularly uſed to expreſs the act whereby the two ſeparate kingdoms of England and Scotland were incorporated into one, under the title of the kingdom of Great-Britain. This happy union, in vain attempted by king James I. was at length effected in the year 1707, by the general conſent of the queen and the eſtates of each realm. The chief articles of this union are, That the two kingdoms ſhall be united into one kingdom, by the name of Great-Britain: that they, in conſequence thereof, be repreſented by one parliament, of which ſixteen peers and forty-five commoners are to be elected for Scotland, and have the ſame privileges with thoſe of England: that the ſubjects of either nation ſhall have equal freedom of trade, and be liable to the ſame cuſtoms, and the like laws for public government, &c.

The kirk, or church of Scotland, is confirmed; and the courts of juſtice are to remain the ſame as they were before the union, yet ſubject to regulation, &c.

A court of exchequer is alſo erected in Scotland, to be a court of record, revenue, and judicature for ever; and barons of the ſaid court are appointed, who ſhall be the judges there, &c.

UNISON, in muſic, the effect of two ſounds which are equal in degree of tune, or in point of gravity and acuteneſs.

Uniſon may be defined a conſonance of two ſounds produced by two ſtrings, or other bodies, of the ſame matter, length, thickneſs, tenſion, &c.

equally ſtruck, and at the ſame time: ſo that they yield the ſame tone or ſound. See SOUND.

Uniſon is the firſt and greateſt of concords, and the foundation of all the reſt, according to Ariſtoxanus and moſt of the ancients: yet ſome deny it to be any concord at all, maintaining it to be only that in ſounds which unity is in numbers.

Others reſtrain the word concord to intervals, and make it include a difference of tune; but this is precarious: for as the word concord ſignifies an agreement of ſounds, it is certainly applicable to uniſons of the firſt degree.

But though uniſonance, or an equality of tune, makes the moſt perfect agreement of ſound, it is not true, that the nearer any two ſounds come to an equality of tune, they are the more agreeable. The mind is delighted with variety; and the reaſon of the agreeableneſs or diſagreeableneſs of two ſounds muſt be aſcribed to ſome other cauſe than the quality or inequality of the number of their vibrations. It is a famed phænomenon in muſic, that an intenſe ſound being raiſed, either with the voice or ſonorous body, another ſonorous body near it, whoſe tune is either uniſon or octave to that ſound, will ſound its proper note, uniſon or octave, to the given note. The experiment is eaſily tried by the ſtrings of two inſtruments, or by a voice and harpſichord; or a a bell, or even a drinking-glaſs.

This our philoſophers account for thus: one ſtring being ſtruck, and the air put in motion thereby, every other ſtring, within the reach of that motion, will receive ſome impreſſion therefrom: but each ſtring can only move with a determined velocity of recourſes or vibrations; and all uniſons proceed from equal or equidiurnal vibrations; and other concords, from other proportions. The uniſon ſtring then, keeping equal pace with the ſounding ſtring, as having the ſame meaſure of vibrations, muſt have its motion continued, and ſtill improved, till its motion become ſenſible, and it gives a diſtinct ſound. Other concording ſtrings have their motion propagated in different degrees, according to the frequency of the coincidence of their vibrations, with thoſe of the ſounded ſtring; the octave therefore, moſt ſenſibly: then in the fifth; after which the croſſing of the motions prevents any effect.

This they illuſtrate by the pendulum, which, being ſet a moving, the motion may be continued, and ſtill improved, and augmented, by making frequent, light, coincident impulſes; as blowing on it when the vibration is juſt finiſhed: but if touched by any croſs or oppoſite motion, and this too frequently, the motion will be interrupted and ceaſe altogether.

So of two uniſon-ſtrings, if the one be forcibly ſtruck, it communicates motion by the air to the other: and being equidiurnal in their vibrations, that is, finiſhing them preciſely together, the motion of the other will be improved and heightened by the frequent impulſes received from the vibrations of the firſt; becauſe given preciſely, when that other has finiſhed its vibration and is ready to return: but if the vibration of the chords be unequal in duration, there will be a croſſing of motions leſs or more, according to the proportion of the inequality; by which means the motion of the untouched ſtring will be ſo checked as never to be ſenſible. And this, we find, is the caſe in all conſonances, except uniſon, octave, and the fifth.

UNIT, UNITE, or UNITY, in arithmetic, the number one, or one ſingle individual part of diſcrete quantity.

UNITY, in poetry. In the drama there are three unities to be obſerved, viz. the unity of action, that of time, and that of place. In the epic poem, the great, and almoſt only, unity, is that of the action. Some regard, indeed, ought to be had to that of time; that of place there is no room for. The unity of character is not reckoned among the unities. See the article EPIC, &c.

The unity of the dramatic action conſiſts of the unity of the intrigue in comedy, and that of the danger in tragedy; and this not only in the plan of the fable, but alſo in the fable extended and filled with epiſodes.

The epiſodes are to be worked in without corrupting the unity, or forming a double action; and the ſeveral members are to be ſo connected together, as to be conſiſtent with that continuity of action ſo neceſſary to the body, and which Horace preſcribes when he ſays, "Sit quodvis ſimplex duntaxat & unum." See the article EPISODE.

The unity of the epic action, Mr. Dacier obſerves, does not conſiſt in the unity of the hero, or in the unity of his character and manners, though theſe be circumſtances neceſſary thereto. The unity of action requires that there be but one principal action, of which all the reſt are to be incidents or dependencies. See ACTION.

F. Boſſu aſſigns three things requiſite thereto; the firſt, that no epiſode be uſed but what is fetched from the plan and ground of the action, and which is a natural member of that body; the ſecond, that the epiſodes and members be well connected with each other; the third, is not to finiſh any epiſode, ſo as it may appear a whole action, but to let each be always ſeen in its quality of member of the body, and an unfiniſhed part.

UNITY *of Poſſeſſion*, in law, ſignifies a joint poſſeſſion of two rights by ſeveral titles.

UNIVALVE SHELLS, in natural hiſtory, a term uſed to expreſs one of the three general claſſes of ſhell-fiſh; the other two being the bivalves and multivalves.

The univalve ſhells are thoſe which conſiſt only of one piece, not of two or more joined together.

See

See the articles SHELL, BIVALVE, and MULTIVALVE.

UNIVERSAL, ſomething that is common to many things; or it is one thing belonging to many, or all things.

In logic, univerſal is either complex or incomplex. A complex univerſal is either an univerſal propoſition, as every whole is greater than its part; or whatever raiſes a manifold conception in the mind, as the definition of a reaſonable animal. An incomplex univerſal, is what produces only one conception in the mind, and is a ſimple thing reſpecting many; as human nature, which relates to every individual wherein it is found.

UNIVERSALITY, that quality which denominates a thing univerſal. See the preceding article.

UNIVERSE, a collective name, ſignifying the whole world, or the aſſemblage of heaven and earth, with all things therein.

As ſpace is, in its own nature, every way infinite, it gives us an idea of the infinity of the univerſe, which can therefore be only in part comprehended by us: and that part of the univerſe which we can have any notion of, is that which is the ſubject of our ſenſes; and of this the eye preſents us with an idea of a vaſt extended proſpect, and the appearance of various ſorts of bodies diſſeminated through the ſame.

The infinite abyſs of ſpace (which the Greeks call τὸ πᾶν, the Latins *inane*, and we the univerſe) does undoubtedly comprehend an infinity of ſyſtems of moving bodies round one very large central one, which the Romans call *ſol*, and we the ſun. This collection of bodies is therefore properly called the ſolar ſyſtem, and ſometimes the mundane ſyſtem, from the Latin word *mundus*, the world. See the article SYSTEM.

That the univerſe contains as many ſolar ſyſtems, or worlds, as there are what we call fixed ſtars, ſeems reaſonable to infer from hence, that our ſun, removed to the diſtance of a ſtar, would appear juſt as a ſtar does, and all the bodies moving about it would diſappear entirely. Now, the reaſon why they diſappear, is becauſe they are opake bodies, and too ſmall to be ſeen at ſo great a diſtance, without an intenſe degree of light; whereas theirs is the weakeſt that can be, as being firſt borrowed, and then reflected to the eye. See STAR.

But the ſun, by reaſon of his immenſe bulk and innate light, which is the ſtrongeſt poſſible, will be viſible at an immenſe diſtance; but the greater the diſtance, the leſs bright it will appear, and of a leſſer magnitude: and therefore every ſtar of every magnitude, may probably be a ſun like our own, informing a ſyſtem of planets, or moving bodies, each of which may be inhabited like our earth, with various kinds of animals, and ſtored with vegetable and other ſubſtances.

We can perceive, ſays Mr. Mac Laurin, no bounds of the vaſt expanſe in which natural cauſes operate; nor can we fix any border or termination of the univerſe; and we are equally at a loſs to trace things to their elements, and to diſcover the limits, which incloſe the ſubdiviſions of matter.

The objects, which which we commonly call great, vaniſh when we contemplate the vaſt body of the earth: the terraqueous globe itſelf is ſoon loſt in the ſolar ſyſtem; being in ſome parts ſeen as a planet, or diſtant ſtar; and, in great part of the ſyſtem unknown, or viſible only at rare times to vigilant obſervers, aſſiſted perhaps with inſtruments like our teleſcopes. The ſun itſelf dwindles into a ſtar: Saturn's vaſt orbit, and the orbits of all the comets, croud into a point, when viewed from numberleſs places between the earth and the neareſt fixed ſtars. Other ſuns illuminate other ſyſtems, where our ſun's rays are unperceived; but all theſe alſo are ſwallowed up in the vaſt expanſe of the univerſe. Even all the ſyſtems of the ſtars that ſparkle in the cleareſt ſky, muſt poſſeſs a ſmall corner only of that ſpace over which ſuch ſyſtems are diſperſed. And after we have riſen ſo high, and left all definite meaſures ſo far behind us, we find ourſelves no nearer to a term or limit; for all this is nothing to what may be diſplayed in the infinite expanſe, beyond the remoteſt ſtars that ever have been diſcovered.

In this view of the univerſe, an auguſt idea ariſes in the mind, worthy of the infinite and wiſe Author of nature, who can never be ſuppoſed to have created ſo many glorious orbs, to anſwer ſo trifling a purpoſe as the twinkling to mortals by night now and then; beſides that, the far greateſt part of the ſtars are never ſeen by us at all, as has been ſhewn under the article STAR, which ſee.

UNIVERSITY, *Univerſitas*, a collective term, applied to an aſſemblage of ſeveral colleges, eſtabliſhed in a city, or out-town, wherein are profeſſors in the ſeveral ſciences, appointed to teach them to ſtudents; and where degrees or certificates of ſtudy in the divers faculties are taken up.

In each univerſity four faculties are uſually taught; theology, medicine, law, and the arts and ſciences. See THEOLOGY, &c.

They are called univerſities, or univerſal ſchools, by reaſon the four faculties are ſuppoſed to take in the whole compaſs of ſtudy. See FACULTY.

In the eye of the law, an univerſity is held a mere lay body, or community; though, in reality, it be a mixed body, compoſed partly of laymen, and partly of eccleſiaſtics.

Univerſities had their firſt riſe in the XIIth and XIIIth centuries. Thoſe of Paris and Bologna pretend to be the firſt that were ſet on foot; but then they were on a different footing from the univerſities among us.

Our own univerſities, of Oxford and Cambridge, ſeem entitled to the greateſt antiquity of any in the

world; and Baliol and Merton colleges in Oxford, and St. Peter's in Cambridge, all made colleges in the XIIIth century, may be ſaid to be the firſt regular endowments of this kind in Europe. For though Univerſity-college in Cambridge had been a place for ſtudents ever ſince the year 872, yet this, like many of the ancient colleges beyond ſea, and Leyden to this day, was no proper college; but the ſtudents, without any diſtinction of habit, lived in citizens houſes, having only meeting places to hear lectures and diſpute.

In after-times, there were houſes built for the ſtudents to live in ſociety; only each to be at his own charge, as in the inns of court: theſe, at firſt, were called inns, but now halls. At laſt, plentiful revenues were ſettled on ſeveral of theſe halls, to maintain the ſtudents in diet, apparel, &c. and theſe were called colleges. See the article COLLEGE.

The univerſities of Oxford and Cambridge are governed next under the king, by a chancellor, who is to take care of the government of the whole univerſity, to maintain the liberties thereof, &c. Under him is the high-ſteward, whoſe office is to aſſiſt the chancellor and other officers, when required, in the execution of their offices, and to hear and determine capital cauſes, according to the laws of the land, and the privileges of the univerſity. The next officer is the vice-chancellor, who officiates for the chancellor in his abſence.

There are alſo two proctors, who aſſiſt in the government of the univerſity, particularly in the buſineſs of ſchool exerciſe, taking up degrees, puniſhing violators of the ſtatutes, &c. Add to theſe, a public orator, keeper of records, regiſter, beadles, and verger.

The univerſities of Scotland are four, viz. thoſe of St. Andrew, Aberdeen, Edinburgh, and Glaſgow. In Ireland there is only one univerſity, viz. that of Dublin.

UNIVOCAL, in the ſchools, is applied to two or more names, or terms, that have but one ſignification, in oppoſition to equivocal, which is where one term has two or more ſignifications. See the article EQUIVOCAL.

Our univocal terms are ſuch, whoſe name as well as nature, is the ſame, in oppoſition to equivocals, whoſe names are the ſame, but their natures very different.

The ancients believed that all perfect animals were produced by univocal generation; that is, by the ſole union or copulation of a male and female of the ſame ſpecies or denomination; and that inſects were produced by equivocal generation, without any ſeed, and merely of the corruption of the earth, exhaled, and, as it were, impregnated, by the ſun's rays: but this doctrine of inſects is now exploded.

UNLAWFUL, illegal, ſomething prohibited by, or contrary to, the terms of law, either divine or human. See LAW.

UNLAWFUL ASSEMBLY, the meeting of three or more perſons together, by force to commit ſome unlawful act, as to aſſault any perſon, to enter his houſe or land, &c. and thus abiding together, whether they attempt the execution or not.

UNLIMITED, or INTERMEDIATE PROBLEM, is ſuch a one as is capable of infinite ſolutions. See PROBLEM.

UNMOOR, a term uſed at ſea: when a veſſel which was riding at anchor weighs the ſame, or gets it up, in order to ſail, they ſay ſhe is unmooring.

VOCABULARY, *Vocabularium*, in grammar, denotes the collection of the words of a language, with their ſignifications, otherwiſe called a dictionary, lexicon, or nomenclature.

A vocabulary is properly a leſſer kind of dictionary which does not enter ſo minutely into the origins and different acceptations of words.

VOCAL, ſomething that relates to the voice or ſpeech: thus vocal muſic is that ſet to words, eſpecially verſes, and to be performed by the voice, in contradiſtinction to inſtrumental muſic, compoſed only for inſtruments, without ſinging. See the article VOICE.

VOCATIVE, in grammar, the fifth ſtate or caſe of nouns.

When we name the perſon we are ſpeaking to, or addreſs ourſelves to the thing we are ſpeaking of, as if it were a perſon, the noun, or name, requires a new relation, which the Latins and Greeks expreſs by a new termination, called the vocative; as from *dominus*, *a lord*, is formed the vocative *domine*, *O lord*.

In Engliſh, and moſt of the modern languages, the vocative is expreſſed in nouns that have an article in the nominative, by omitting that article; as *the Lord is my hope: Lord, thou art my hope:* though on many occaſions, we uſe an interjection.

VOICE, *Vox*, a ſound produced in the throat and mouth of an animal, by an apparatus of inſtruments for that purpoſe. See the article SOUND.

Voices are either articulate or inarticulate. Articulate voices are thoſe whereof ſeveral conſpire together to form ſome aſſemblage or little ſyſtem of ſounds; ſuch are the voices expreſſing the letters of an alphabet, numbers of which joined together, form words. Inarticulate voices are ſuch as are not organized, or aſſembled into words; ſuch is the barking of dogs, the braying of aſſes, the hiſſing of ſerpents, the ſinging of birds, &c.

The formation of the human voice, with all the varieties thereof obſerved in ſpeech, muſic, &c. makes a very curious article of inquiry; and the apparatus and organiſm of the parts adminiſtring thereto, is ſomething exceedingly ſurpriſing.

Thoſe parts are the trachea or wind-pipe, through which the air paſſes and repaſſes into the lungs; the larynx

larynx, which is a ſhort cylindric canal at the head of the trachea; and the glottis, which is a little oval cleft or chink left between two ſemicircular membranes ſtretched horizontally withinſide the larynx; which membranes, though capable of joining cloſe together, do generally leave an interval, either greater or leſs, between them called the glottis.

The long canal of the trachea, terminated at top with the glottis, appears ſo like a flute, that the ancients made no doubt but the trachea contributed the ſame to the voice, as the body of the flute does to the ſound of that inſtrument. Galen himſelf fell in ſome meaſure into the miſtake; he perceived indeed, that the principal organ of the voice was the glottis, but he ſtill allowed the trachea a conſiderable ſhare in the production of the ſound.

Galen's opinion was followed by all the ancients after him, and even by all the moderns before M. Dodart: but that author obſerves, that we do not either ſpeak or ſing when we inſpire or take in the air, but only when we exſpire or expel it; and that the air coming out of the lungs, paſſes always out of the minuter veſicles of that part into larger, and at laſt into the trachea itſelf, which is the largeſt of all: that thus its paſſage becoming ſtill more free and eaſy, and thus more than ever in the trachea, it can never undergo ſuch a violence, and acquire ſuch a velocity in that canal, as is required to the production of ſound: but that as the aperture of the glottis is very ſmall, in compariſon with the width of the trachea, the air can never get out of the trachea by the glottis, without a vaſt compreſſion and augmentation of its velocity; and that by this means in paſſing, it communicates a briſk agitation to the minuter parts of the two lips of the glottis, and gives them a kind of ſpring, and occaſions them to make vibrations, which communicated to the paſſing air, are what really occaſion the ſound. The ſound thus formed, proceeds into the cavity of the mouth and noſtrils, where it is reflected and reſounds: and on this reſonance, M. Dodart ſhews, it is that the agreeableneſs of the voice intirely depends. The different conſiſtences, forms, &c. of the divers parts of the mouth, contribute to the reſonance, each in their way; and from this mixture of ſo many different reſonances in their due proportion, there reſults an harmony in the human voice inimitable by any muſician.

Hence it is that when any of theſe parts are diſordered, e. g. when the noſe is ſtopped, the voice becomes diſpleaſing. This reſonance in the cavity of the mouth, does not ſeem to conſiſt in a ſimple reflexion, ſuch as that of a vault, &c. but in a reſonance proportionate to the tones of the ſound ſent into the mouth from the glottis; and accordingly we find this cavity to lengthen and ſhorten itſelf, according to the depth or acuteneſs of the tone.

As the organs that form the voice make a kind of wind inſtrument, one might imagine to find ſome proviſion therein anſwerable to that which produces the difference of tone in ſome other wind-inſtruments. The tone, therefore, muſt be attributed, either to the mouth and noſtrils, which occaſion the reſonance, or to the glottis, which produces the ſound: and as all the different tones are produced in man by the ſame inſtrument, it follows, that the part which produces them, muſt be capable of changes anſwerable thereto. The different apertures of the lips of the glottis, it is proved, produce all the different tones in the ſeveral parts of muſic, and the manner is thus. The voice, it is ſhewn, can only be formed by the glottis, but the tones of the voice are modifications of the voice, and theſe can only be produced by the modifications of the glottis. Now the glottis is capable only of one modification, which is the mutual approach or receſs of its lips; it is this, therefore, produces the different tones. Now that modification includes two circumſtances; the firſt and principal is, that the lips are ſtretched more and more from the loweſt tone to the higheſt: the ſecond is, that the more they are ſtretched, the nearer they approach. From the firſt, it follows, that their vibrations will be ſo much the quicker, as they come neareſt their higheſt tone; and that the voice will be juſt, when the two lips are equally ſtretched; and falſe, when unequally; which agrees perfectly well with the nature of ſtring inſtruments. From the ſecond, it follows, that the higher the tones are, the nearer will they approach to each other, which agrees perfectly well with inſtruments governed by reeds or plugs.

The degrees of tenſion of the lips, are the firſt and principal cauſe of tones, but their differences are inſenſible; the degrees of approach are only conſequences of that tenſion, but their differences are more eaſily aſſigned. They are different apertures that produce, or at leaſt that accompany, different tones, both in natural wind inſtruments, and artificial ones; and the diminution of the aperture, raiſes the tones both of the glottis, and the reed.

VOICE, in grammar, a circumſtance in verbs, whereby they come to be conſidered as either active or paſſive, i. e. either expreſſing an action impreſſed on another ſubject, as, *I beat*, or receiving it from another, as, *I am beaten.*

The Greeks have a third voice called the medial voice, thus denominated, becauſe it has ſometimes an active and ſometimes a paſſive ſignification; tho' generally it is of an active ſignification. With regard to the termination of this medial voice, it is to be obſerved, that the preſent and imperfect tenſes are the ſame with thoſe of the paſſive voice; or, in other words, when theſe tenſes of the paſſive voice are taken actively, they are then denominated of the medial voice.

VOID SPACE, in phyſics. See the article VACUUM, &c.

VOID and VOIDABLE, are terms frequently uſed in our law; as a thing that is done contrary to law at the time of the doing, it is ſaid to be void, and no perſon ſhall be bound thereby. But where a thing is only voidable, and not void, though it be what the perſon that did it ought not to have done, yet when it is done, the doer cannot avoid the ſame, notwithſtanding by ſome act in law it may be void in his heir, &c. It has been held, that the bond of an infant, or one non compos mentis, is void, becauſe the law has not appointed the doing any thing to avoid ſuch bonds. A leaſe for term of life, which is voidable, muſt be made void by re-entry, &c. and a deed is generally avoided by ſpecial pleading.

VOIDED, in heraldry, is underſtood of an ordinary whoſe inner or middle part is out, leaving nothing but its edges to ſhew its form, ſo that the field appears through it. Hence it is needleſs to expreſs the colour or metal of the voided part, becauſe it muſt of courſe be that of the field. The croſs voided, differs from the croſs fimbriated, in that the latter does not ſhew the field through it, as the other does; and the ſame obtains in other ordinaries.

VOIDER, in heraldry, one of the ordinaries whoſe figure is much like that of a flaſk of flanch, only that it doth not bend ſo much.

VOL, among heralds, ſignifies the two wings of a fowl joined together, borne in armoury, as being the whole that makes the flight. Accordingly, a demivol is a ſingle wing.

VOLA, the palm or inſide of the hand, comprehended between the fingers and the wriſt.

VOLANT, in heraldry, is when a bird in a coat of arms is drawn flying, or having its wings ſpread out.

VOLATILE, in phyſics, is commonly uſed to denote a mixed body whoſe integral parts are eaſily diſſipated by fire or heat; but it is more properly uſed for bodies whoſe elements or firſt component parts are eaſily ſeparated from each other, and diſperſed in air. For as any mixed body is ſaid to be fixed in a double ſenſe, ſo may it be ſaid to be volatile two ways; whence the ſame body, *e. gr.* mercury, is both volatile and fixed at the ſame time; ſince, as its integral parts, or thoſe which ſtill retain the nature of mercury, are eaſily ſeparable by fire, and readily flies away, it is ſaid to be volatile; and yet as it is very difficult to deſtroy its contexture, and reſolve it by fire, or any other menſtruum, into its firſt elements, it is ſaid to be fixed; the ſame may be ſaid of ſulphur, antimony, &c. See the article FIXED BODIES.

Minerals, for the generality, are leſs volatile than vegetables, and vegetables are leſs ſo than animals. The chemiſts diſtinguiſh greatly between volatile ſalts and fixed ſalts. The capitals of aludels ſtop and collect the volatile parts of ſubſtances in ſublimation, and make what we call flowers.

The particles of fluids which do not cohere very ſtrongly together, ſays Sir Iſaac Newton, and are of ſuch a ſmallneſs as renders them moſt ſuſceptible of thoſe agitations which keep liquors in a fluor, are moſt eaſily ſeparated and rarefied into vapour; and, in the language of the chemiſts, they are volatile, rarifying with an eaſy heat, and condenſing with cold. But thoſe which are groſſer, and by that means leſs ſuſceptible of agitation, or cohere by a ſtronger attraction, are not ſeparated without a ſtronger heat, or perhaps not without fermentation; theſe are what the chemiſts call fixed bodies.

When the fire decompounds any mixed body, the parts moſt diſpoſed to receive a great motion are ſooneſt looſened, and riſe up in the order which the differences of that diſpoſition give them, the reſt remaining immoveable at the bottom of the veſſel. Thoſe that riſe firſt are called volatile parts; ſuch are phlegm, oil, ſpirits and ſalts, both urinous and alkalious. The parts remaining, viz. earth and lixivial ſalts, are called fixed.

VOLATILISATION, or VOLATILIZATION, the act of rendering fixed bodies volatile, or of reſolving them by fire into a fine ſubtile vapour or ſpirit, which eaſily diſſipates and flies away. All bodies, even the moſt fixed, as gold, may be volatilized; either of themſelves, or with the admixture of ſome volatile ſubſtance, or ſpirit, by diſtillation or ſublimation. See the articles GOLD, DISTILLATION, &c.

VOLATILITY. See the articles VOLATILE and SUBLIMATION.

VOLCANO, or VULCANO. See the article VULCANO.

VOLERY, a great bird-cage, ſo large that the birds have room to fly up and down in it.

VOLITION, the act of willing. See the article WILLING.

VOLKAMERIA, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is cylindric, and double the length of the cup; and the limb is divided into five almoſt equal ſegments: the ſtamina are four long ſlender filaments, topped with ſingle antheræ: the fruit is a roundiſh bilocular capſule, containing two furrowed nuts.

Volkameria grows naturally in India; the root ſends forth many weak ſhrubby ſtalks, which riſe to the height of twelve or fourteen feet; they are covered with a white bark, and furniſhed with oval ſpear-ſhaped leaves, about three inches long and one and a half broad, of a lucid green colour, and ſmooth; they are placed by pairs on ſhort foot-ſtalks: the flowers are produced from the wings of the ſtalks, in umbellated bunches, like thoſe of the jaſmine, to which the flowers have a great reſemblance; their colour is white, and they have an agreeable odour.

This plant is increaſed, with us, from cuttings in the ſummer months; but being tender, requires a hot-houſe for its preſervation in winter.

VOLKAMERIA, is alſo a name given by ſome authors to the tinus of Linnæus. See the article TINUS.

VOLLEY, a military ſalute, made by diſcharging a great number of fire-arms at the ſame time.

VOLT, or VOLTE, in the manege, a round or circular tread; and hence, by the phraſe, to make volts, is underſtood a gate of two treads, made by a horſe going ſideways round a center, in ſuch a manner, that theſe two treads make parallel tracts, one larger, made by the fore-feet, and another ſmaller, made by the hind-feet, the croup approaching towards the center, and the ſhoulders bearing outwards.

Sometimes the volt is of one tread; as when a horſe makes volts in corvets, and in caprioles, ſo that the haunches follow the ſhoulders, and move forwards on the ſame tread.

In general, the way and tract of a volt is made ſometimes round, ſometimes oval, and ſometimes ſquare, of four ſtraight lines; ſo that theſe treads, whether round or ſquare, incloſe a terrain, or manege ground, the middle of which is ſometimes diſtinguiſhed by a pillar, or elſe by an imaginary center, which is there ſuppoſed in order to regulate the diſtances and the juſtneſs of the volt.

A demi-volt is a demi-round of one or two treads, made by the horſe at one of the corners of the volt, or elſe at the end of the line of the paſſade; ſo that being near the end of this line, or one of the corners of the volt, he changes hands, to return by a ſemi-circle.

A renverſed volt is a tract of two treads, made by the horſe, with his head to the center, and his croup out; ſo that he goes ſideways upon a walk, trot, or gallop, and traces out a ſmall circumference with his ſhoulders, and a larger one with his croup.

This different ſituation of the ſhoulders and the croup, with reſpect to the center, gave this volt the name of renverſed, as being oppoſite in ſituation to the former.

VOLUBILIS, in botany, a name uſed by Dillenius for a ſpecies of convolvulus. See the article CONVOLVULUS.

VOLUME, *Volumen*, in matters of literature, a book, or writing, of a juſt bulk to be bound by itſelf. The name is derived from the Latin *volvere*, to roll up; the ancient manner of making up books being in rolls of bark or parchment.

Foreign philoſophers uſe the phraſe, volume of a body, for its bulk, or the ſpace contained within its ſuperficies.

VOLUNT, *Voluntas*, in law, is when a tenant holds lands, &c. at the will of the leſſor, or lord of the manor. See the article TENURE.

VOLUNTARY, in muſic, a piece played by a muſician, extempore, according to his fancy. This is often uſed before he begins to ſet himſelf to play any particular compoſition, to try the inſtrument, and to lead him into the key of the piece he intends to perform.

VOLUNTEERS, in the military art, perſons who, of their own accord, and at their own expence, ſerve in the army.

VOLUTA, in natural hiſtory, a genus of univalve ſhells, with an oblong mouth, a clavicle ſometimes erect and ſometimes depreſſed, and ſometimes coronated at top.

To this genus belong the admiral-ſhells, tiger-ſhells, &c.

VOLUTE, *Voluta*, in architecture, a kind of ſpiral ſcroll, uſed in the Ionic and Compoſite capital: whereof it makes the principal characteriſtic and ornament.

There are ſeveral diverſities practiſed in the volute. In ſome, the liſt or edge, throughout all the circumvolutions, is in the ſame line or plane; ſuch are the antique Ionic volutes, and thoſe of Vignola. In others, the ſpires or circumvolutions fall back; in others, project and ſtand out. Again, in others, the circumvolutions are oval; in others, the canal of one circumvolution is detached from the liſt of another by a vacuity or aperture. In others, the rind is parallel to the abacus, and ſprings out from behind the flower thereof. In others, it ſeems to ſpring out of the vaſe from behind the ovum, and riſes to the abacus, as in moſt of the fine Compoſite capitals.

VOLVULUS, in medicine, a name which ſome authors give to the iliac paſſion, by others called chordapſus, and by others miſerere mei. See the article ILIAC.

VOMER, in anatomy, a bone of the upper jaw, ſituated between the bones of the palate and the ſphenoidal bone, being alſo joined to the proceſs of the ethmoides, and part of the lower jaw, and having its fore part, which is ſpongy, continued to the middle cartilage of the noſe, and making, in conjunction with it, the ſeptum naſi. See the articles NOSE and MAXILLA.

VOMICA, in medicine, is commonly taken for a ſuppurated impoſthume, or an abſceſs with a ſuppuration.

Nux VOMICA, in pharmacy, a flat, compreſſed, round fruit, of the breadth of a ſhilling, or ſomewhat more, and of about the thickneſs of a crown piece.

Its ſurface is not much wrinkled or corrugated, but ſometimes marked with tolerably regular fibres, running from the center to the circumference; it is ſomewhat downy or woolly, and of an extreme firm texture, tough like horn, and of a pale greyiſh-brown colour.

It has a ſort of umbilicus on each ſide of the center, and is more prominent on one ſide, and more depreſſed on the other; it is very difficultly cut or broken, and leaves a ſmooth and gloſſy ſurface behind the knife; it is moderately heavy, and is of a ſomewhat paler colour within than on the ſurface; it has no ſmell, but an extremely bitter taſte.

We have it only from the Eaſt-Indies, whence it is brought with another drug called the lignum colubrinum. It was held by many to be the root of a plant, and by others to be a fungus or an excrement. But it is in reality the nucleus of a fruit of an Eaſt-Indian tree, the wood of which is the lignum colubrinum of the ſhops. See the article COLUBRINUM.

Some have preſcribed ſmall doſes of the nux vomica, as a ſpecific againſt a gonorrhœa, and others againſt quartan agues. But we have ſo many ſafe and good medicines for all theſe purpoſes, that there ſeems no occaſion for our having recourſe to ſuch as theſe, which ſhew ſo many ſigns of miſchief.

There is another ſpecies of the nux vomica, deſcribed by Breynius under the name of modira caniram, and nux vomica officinarum vera. Commelin determines this tree, not the former, to afford the true nux vomica, and the true lignum colubrinum of the ſhops; and Herman, on the other hand, is as poſitive as to the other.

There is alſo another ſort of nux vomica, which is much ſmaller than the former, very like them, and has all their qualities: it is the fruit of another ſpecies of the ſame genus, which is the tree that furniſhes the true officinal wood.

VOMIT, or EMETIC, in pharmacy. See the article EMETIC.

VOMITING, in medicine, a retrograde ſpaſmodic motion of the muſcular fibres of the œſophagus, ſtomach, and inteſtines, attended with ſtrong convulſions of the muſcles of the abdomen and diaphragm, which when gentle, create a nauſea; when violent, a vomiting. Theſe convulſive diſorders proceed from the immoderate quantity, or acrimony of the food; from poiſons; from ſome injury of the brain, as a wound, contuſion, compreſſion, or inflammation of that part; from an inflammation of the diaphragm, ſtomach, inteſtines, ſpleen, liver, kidneys, pancreas, or meſentery; from an irritation of the gula; from a diſorderly motion of the ſpirits, by unaccuſtomed agitation in a coach, ſhip, or otherwiſe, or from the idea of ſomething nauſeous.

The two principal curative indications to be obſerved are, firſt, to quiet and compoſe the convulſive and unruly motion of the ſtomach; and, ſecondly, to oppoſe and ſubdue the material cauſes of the diſorder.

The firſt intention is anſwered by corroborating and antiſpaſmodic medicines, ſuch as ſaffron and caſtor, with the taſtaceous powders, as coral, crabs-claws, and oyſter-ſhells; powders compoſed of cinnamon, the leaves of mint, nutmeg, orange-peel, calamus aromaticus, and other ſuch ſimples, are alſo of great ſervice. And if anodynes are found neceſſary, the ſtorax pill, or Sydenham's laudanum, are to be given.

While theſe medicines are taken internally, there may alſo be applied outwardly, to the region of the ſtomach, ſuch things as have power to repreſs its diſorderly motions; of this kind are the oil of mint, nutmeg, and the like, with balſam of Peru; theſe oils may be reduced to a proper conſiſtence, with this balſam, for the ſpreading on leather, and laying on for ſome time. Hungary-water, and other like ſpirits, are of great uſe alſo, rubbed on with the hand; and to theſe may be added yeaſt, and the ſtrongeſt wine-vinegar applied hot to the part.

Finally, an excellent application is balſam of Peru alone, reduced to the conſiſtence of a cataplaſm, with crumb of bread.

The methods to be uſed to remove the material cauſes of the vomiting, are next to be conſidered: if it be of the petuitous kind, and owing to crudities in the primæ viæ, and a viſcid mucus ſticking to them, it is beſt cured by an emetic: if the vomiting of itſelf be found not ſufficient to carry off the ſordes which occaſion it, and the patient continues, after the fits of vomiting, afflicted with a nauſea and heart-burn; in this caſe, a large quantity of warm water, with a little butter, may ſerve the purpoſe; or if this be found inſufficient, a doſe of ipecacuanha is to be given.

VOMITINGS *in Infants*. See INFANT.

VOMITING *of Blood*, *Vomitus Cruentus*, a very dangerous kind of hæmorrhage, conſiſting in a bringing up by vomit of pure and unmixed blood from the ſtomach, and being a method, uſed by nature to throw off a portion of the blood, which moleſts the whole in the vena porta, and by that means to facilitate the circulation of the reſt of the maſs. See HÆMORRHAGE.

This diſtemper ſometimes ariſes from internal cauſes, and is regularly periodical, obſerving the ſtated times of the eruptions of the menſes, or other natural diſcharges; ſometimes it ariſes from accidents, ſuch as the giving of violent purging or emetic medicines, or corroſive ones. Among the preceding ſigns of this diſorder, are to be reckoned a ſenſation of ſtraitneſs and anxiety in the præcordia, with tenſion, and involuntary ſighs; with a nauſea or ſickneſs of the ſtomach, and a ſtraining to vomit; which is more violent than in vomiting on any other occaſion; after this the blood is thrown up pure, and the vomiting then ceaſes, till, after a plain ſenſation of more blood being collected in the ſtomach, the efforts to diſcharge it in the ſame manner are again renewed. The quicker the blood is thrown

up,

up, after its being discharged into the stomach, the more fluid and more florid it appears; the longer it is detained there, the blacker and thicker it appears.

A vomiting of blood is but an uncommon disorder. It more frequently attacks women than men; among the female sex it is principally seen in those whom the menses have left too early in life, or who have had violent suppressions of them for a long time. In men, this distemper seldom seizes any but those who have been used to periodical discharges from the hæmorrhoidal vessels, and who have had them suddenly stopped; and they are then usually first attacked with violent pains in the left hypochondrium. People of scorbutic habits, and such as have had quartan agues of long standing, have been sometimes thus affected. And, beside these natural causes, people of all ages and sexes may vomit blood, from external injuries.

A vomiting of blood is ever a dangerous disorder; for though the quantity of blood thrown up is seldom so great as to occasion immediate death, yet it generally degenerates into a tabes in men, and into a cachectic habit in women. It is less dangerous to young women, than to any other persons; and when it is periodical, especially when it observes the times of the menstrual discharges, is much less dangerous than under any other circumstances. During the paroxysm, the proper medicines are powder of nitre, cinnabar, and the absorbent substances, such as crab's-eyes, or the like, and afterwards bleeding, cupping, and gentle purges; and diaphoretics are to be given for some time.

VORTEX, in meteorology, a whirlwind, or sudden, rapid, or violent motion of the air in gyres or circles.

Vortex is also used for an eddy or whirlpool; or a body of water, in certain seas or rivers, which runs rapidly around, forming a sort of cavity in the middle.

VORTEX, in the Cartesian philosophy, is a system or collection of particles of matter moving the same way, and round the same axis.

Such vortices are the grand machines, whereby those philosophers solve most of the motions and other phænomena of the heavenly bodies. Accordingly, the doctrine of these vortices makes a great part of the Cartesian philosophy.

But this doctrine of vortices is at best merely hypothetical. It does not pretend to shew by what laws and means the celestial motions are really affected, so much as by what means they possibly might, in case it should have so pleased the Creator. But we have another principal which accounts for the same phænomena, as well, nay, better, than that of vortices; and which we plainly find has an actual existence in the nature of things; and this is gravity, or the weight of bodies.

The vortices then should be cast out of philosophy, were it only that two different adequate causes of the same phænomena are inconsistent.

But we have other objections against it. For, 1. If the bodies of the planets and comets be carried round the sun in vortices, the bodies of the parts of the vortex immediately investing them, must move with the same velocity, and in the same direction; and besides, must have the same density, or the same vis inertiæ. But it is evident that the planets and comets move in the very same parts of the heavens, with different velocity and in different directions. It follows, therefore, that these parts of the vortex must revolve at the same time in different directions, and with different velocities; since one velocity and direction will be required for the passage of the planets, and another for that of comets. 2. If it were granted that several vortices were contained in the same space, do penetrate each other, and revolve with divers motions; since those motions must be conformable to those of the bodies which are perfectly regular, and performed in conic sections; it may be asked, how they should have been preserved entire to so many ages, and not disturbed nor confounded by the adverse actions and shocks of so much matter as they meet withal? 3. The number of comets is very great, and their motions perfectly regular, observing the same laws with the planets, and moving in conical orbits, which are exceedingly excentric. Accordingly they move every way, and to all parts of the heavens, freely pervading the planetary regions, and going frequently contrary to the order of the signs; which would be impossible, unless these vortices were away.

4. If the planets move round the sun in vortices, those parts of vortices next the planets, we have already observed, would be equally dense with the planets themselves, consequently, the vortical matter, contiguous to the perimeter of the earth's orbit, would be as dense as the earth itself: and that between the orbits of the earth and saturn, it must be as dense or denser. For a vortex cannot maintain itself, unless the more dense parts be in the center, and the less dense towards the circumference; and, since the periodical times of the planets are in a sesquialterate ratio of their distances from the sun, the parts of the vortex must be in the same ratio. Whence it follows, that the centrifugal force of the parts will be reciprocally as the squares of the distances. Such, therefore, as are at a greater distance from the center, will endeavour to recede therefrom with the less force. Accordingly, if they be less dense, they must give way to the greater force, whereby the parts nearer the center endeavour to rise. Thus the more dense will rise, and the less dense descend; and thus there will be a change of places, till the whole fluid matter of the vortex be so adjusted, as it may rest in æquilibrio.

Thus

Thus will the greateſt part of the vortex, without the earth's orbit, have a degree of denſity and inactivity, not leſs than that of the earth itſelf. Whence the comets muſt meet with a very great reſiſtance, contrary to all appearances.

VOTE, the ſuffrage or reſolve of each of the members of an aſſembly, where any affair is to be carried by a majority; but more particularly uſed for the reſolves of the members of either houſe of parliament.

VOTIVE MEDALS, thoſe on which are expreſſed the vows of the people for the emperors or empreſſes.

VOUCHER, in law, is a perſon called into court, to make good another's warranty, who is either to defend the right againſt the demandant, or yield him other lands to the value, &c.

VOUCHER alſo ſignifies a receipt or acquittance in caſes of account.

VOW, a ſolemn and religious promiſe, or oath.

The uſe of vows is found in moſt religions. They make up a conſiderable part of the pagan worſhip, being made either in conſequence of ſome deliverance, under ſome preſſing neceſſity, or for the ſucceſs of ſome enterprize. Among the Jews, all vows were to be voluntary, and made by perſons wholly in their own power; and if ſuch perſon made a vow, in any thing lawful and poſſible, he was obliged to fulfil it. If he appointed no particular time for accompliſhing his vow, he was bound to do it inſtantly, leſt by delay he ſhould prove leſs able, or be unwilling, to execute his promiſe. Among the Romaniſts, a perſon is conſtituted a religious by taking three vows, that of poverty, chaſtity, and obedience.

VOWS, *vota*, among the Romans, ſignified ſacrifices, offerings, preſents, and prayers, made for the Cæſars and emperors, particularly for their proſperity and continuance of their empire. Theſe were at firſt made every five years, than every fifteen, and afterwards every twenty, and were called quinquennalia, decennalia, and vincennalia.

VOWEL, *vocalis*, in grammar, a letter which affords a complete ſound of itſelf, or a letter ſo ſimple as only to need a bare opening of the mouth to make it heard, and to form a diſtinct voice.

The vowels are ſix in number, viz. A, E, I, O, U, Y, and are called vowels in contradiſtinction to certain other letters, which, depending on a particular application of ſome part of the mouth, as the teeth, lips, or palate, can make no perfect ſound without an opening of the mouth, that is, without the addition of a vowel, and are therefore called conſonants. See the article CONSONANT.

Grammarians reckon alſo eight ſemi-vowels, viz. F, H, L, M, N, R, S, Z, ſo denominated becauſe they approach nearer a vowel in the pronunciation. Of theſe ſemi-vowels four, viz. L, M, N, R, are called liquid.

UPLAND, denotes high ground, or, as ſome call it, terra firma, by which it ſtands oppoſed to ſuch as is mooriſh, marſhy, or low.

The uplands lie either on the tops of hills, or on their ſides, or on the ſlopes of riſing grounds. They ſometimes have a ſandy ſoil, ſometimes a rocky, gravelly, or loamy one; and ſometimes they conſiſt of a tough clay, or a black mould; they are uſed by the farmers, either for grazing or corn, as they happen to be more moiſt or more dry; and this difference depends upon their ſituation and nature. Thoſe lands which lie flat upon the tops of hills, are uſually the drieſt, and thoſe which form the ſlopes or ſides, are generally the moiſteſt, becauſe of the wet that oozes through them. The upland meadows have ſome diſadvantage, as they often need mending or feeding, which thoſe that lie lower do not; but then they make amends for this in their hay, which is always much finer and ſweeter than that of the low lands.

UPRIGHT, in architecture, a repreſentation or draught of the front of a building, called alſo an elevation or orthography.

UPRIGHT, in heraldry, is uſed in reſpect of ſhell fiſhes, as crevices, &c. when ſtanding erect in a coat. Inaſmuch as they want fins, they cannot, according to Guillim, be properly ſaid to be hauriant, that being a term appropriated to ſcaly fiſhes.

URACHUS, in anatomy, a membranous canal in the fœtus of quadrupeds in general, of a pyramidal figure, extended immediately from the fundus of the bladder to the navel, and after paſſing this, it is by degrees enlarged, and makes its way into the allantois at right-angles each way, or nearly ſo, and conveys the urine from the bladder into the cavity of this membrane. In the human fœtus, the whole urachus is not previous, or very rarely ſo; it is uſually found ſolid, in form of a ligament. It ſcarce appears probable, therefore, that it ſerves the office of diſcharging the urine from the bladder in this as in the former caſe, and eſpecially as there is no ſuch membrane as the allantois in the human body, nor any cavity formed for the reception of ſo great a quantity of fluid.

URDE', or URDE'E, in heraldry. A croſs urdé ſeems to be the ſame with what we otherwiſe call chleche, or chlechée.

UREDO, the blaſting or blighting of trees or herbs. It is ſometimes uſed by phyſicians for an itching or burning of the ſkin. See the article BLIGHT.

URENA, Indian-mallow, in botany, a genus of plants, whoſe flower conſiſts of five oblong petals, broad at their apex, but narrow and joining at their baſe; the filaments are numerous, coaleſcing in a cylinder at their baſe, and topped with roundiſh antheræ: the fruit is a round echinated pentagonal capſule, having five cells, each containing an angular ſeed.

URETERS, *ουρητηρες*, in anatomy, two membranaceous

branaceous tubes or pipes, nearly cylindric in figure, and of about the thickneſs of a quill; but their diameter is very uncertain.

They ariſe from the kidneys, one from each, and terminate in the urinary bladder. At their origin in the kidneys they are expanded into the form of a funnel, and this expanſion makes the pelvis of the kidneys. See the article PELVIS.

At their termination, which is in the hinder and lower part of the bladder, they paſs obliquely in between its membranes, and open into the bladder by very narrow orifices, and can admit nothing into them from the bladder. They are not ſtraight, but ſomewhat bent, ſo as to reſemble the letter *S*; their ſubſtance is membranaceous, and they are compoſed of three coats: the firſt, a common one, from the peritonæum; the ſecond, a thin muſcular one; and the third, a nervous one, covered with a lubricous humour; and in this there are ſometimes diſcovered glands. The blood veſſels and nerves come from the adjacent parts.

The uſe of the ureters is to receive the urine ſecreted in the kidneys from the pelvis, and to carry it to the urinary bladder. When theſe are obſtructed, a ſuppreſſion of urine is the conſequence; for there is no other way for the urine to get into the bladder but through them. They are often found of an unnatural ſize, owing to ſtones concreted from among the urine.

URETHRA, *ουρηθρα*, in anatomy, a membranaceous tube or canal; of a cylindric figure, ariſing from the neck of the bladder, and continued to the pudendum, ſerving to diſcharge and carry off the urine and ſemen.

The length of the urethra is very different in both ſexes. In man it is twelve or thirteen inches, from the neck of the bladder to the extremity of the glans. It is ſituated in a kind of narrow furrow, formed between the corpora cavernoſa, in the bottom or lower part of the penis. It does not run perfectly ſtraight, but is bent in a very ſingular manner. Its cavity is as large as that of a gooſe-quill.

It is compoſed of two robuſt membranes, an exterior and interior; their ſubſtance is thin and tough, and between them there is a ſpongeous or cavernous matter, in which ſome authors pretend to have diſcovered glands, but this is uncertain.

The bulb of the urethra is that part of it next to the proſtatæ; it is much thicker than the reſt of the tube, and is about an inch long, and in ſome meaſure reſembles a walnut. It is of a thick and ſpongy texture.

The interior ſurface of the urethra, is full of roundiſh and oblong foraminulæ and furrows, out of which there may often be preſſed a thick viſcous fluid, the uſe of which is to lubricate the urethra, and to defend it from the acrimony of the urine. See PENIS, &c.

The urethra or urinary paſſage in women, uſually called meatus urinarius, is ſituated ſtraight under the clitoris, and ſhews itſelf by a little eminence. Its length is about two fingers breadth; its diameter is greater than that in man, but ſomewhat narrower at the end than elſewhere. It is capable of great dilatation. There are in it certain little ducts, which convey to its inner ſurface a mucous humour, for lubricating and defending it from the acrimony of the urine, like thoſe in man; but their origin is uncertain.

URIM *and* THUMMIM, among the ancient Hebrews, a certain oracular manner of conſulting God, which was done by the high-prieſt dreſſed in his robes, and having on his pectoral, or breaſt-plate.

Various have been the ſentiments of commentators concerning the urim and thummim. Joſephus and ſeveral others, maintain, that it meant the precious ſtones ſet in the high-prieſt's breaſt-plate, which, by ſome extraordinary luſtre, made known the will of God to thoſe who conſulted him.

Spencer believes, that the urim and thummim were two little golden figures ſhut up in the pectoral, as in a purſe, which gave reſponſes with an articulate voice. In ſhort, there are as many opinions concerning the urim and thummim, as there are particular authors that wrote about them.

The ſafeſt opinion, according to Broughton, ſeems to be, that the words urim and thummim ſignify ſome divine virtue and power, annexed to the breaſt-plate of the high-prieſt, by which an oraculous anſwer was obtained from God when he was conſulted by the high-prieſt; and that this was called urim and thummim, to expreſs the clearneſs and perfection which theſe oracular anſwers always carried with them; for urim ſignifies light, and thummim, perfection; theſe anſwers not being imperfect and ambiguous, like the heathen oracles, but clear and evident.

The uſe made of the urim and thummim was to conſult God, in difficult caſes, relating to the whole ſtate of Iſrael; and ſometimes in caſes relating to the king, the ſanhedrim, the general of the army, or ſome other great perſonage.

URINAL, in medicine, a veſſel fit to receive and hold urine, and uſed accordingly for the convenience of ſick perſons.

It is uſually of glaſs, and crooked; and ſometimes it is filled with milk to aſſwage the pain of the gravel. See the articles UROCRITERIUM, STONE, and URINE.

URINAL, in chemiſtry, is an oblong glaſs veſſel, cloſed for making ſolutions, and ſo called from its reſemblance to the glaſſes in which urine is ſet to ſettle for the inſpection of the phyſician. See the preceding article.

URINARIA FISTULA, the urinary paſſage, or urethra. See URETHRA.

URINE, *Urina*, a ſerous and ſaline fluid, of a citron-colour, ſeparated from the blood, and carried by the emulgent arteries to the kidneys, whence it deſcends to the bladder by the ureters, and is, from time to time, emitted thence by the canal of the urethra.

The urine is therefore the ſeroſity of the blood, but not pure, for it is loaded with ſaline, ſulphureous, and terreſtrial particles, of which it is the menſtruum and the vehicle. The ſides of the bladder are guarded by a mucilaginous fluid, excreted by the glands which are between its coats, by which means the urinous ſalts make the leſs impreſſion upon it. This fluid forms the glair which falls to the bottom of the veſſel when a perſon is afflicted with the ſtone.

It is obſervable, that there are three ſorts of ſubſtances differently placed in the urine, viz. the nubecula, the encœorema, and the hypoſtaſis.

The nubecula is a ſort of a pellicle which ſwims on the top of the urine, and conſiſts of the ſaline and fibrous particles of the blood, mixed with the ſeroſity: when it is expoſed to the fire, it changes to a cruſtaceous ſubſtanace. The encœorema, or ſuſpenſion, is a white light ſpongeous matter, which ſwims in the middle of the urine, conſiſting of particles of a different nature. The hypoſtaſis, or ſediment, is a ſaline, ſulphureous, and terreſtrial matter, which precipitates to the bottom of the urine.

The urine of four-footed beaſts is troubled and muddy, that of men is more clear and limpid. In infants it is more pale and thick than that of middle-aged perſons. In the very old it is more clear, thin, and has not ſo much colour. In hot, bilious conſtitutions, it is more of a ſaffron colour: in the cold and pituitous, pale. Wine drinkers have it of a higher colour, and more thick: in thoſe that uſe much exerciſe it is little and red: in the idle it is pale with a large ſediment. After meals it is copious, inſipid, light, raw, and without ſmell: and after long faſting, it is of a high colour, acrid, and little. Thoſe that ſweat much make little water, which is more muddy and yellow. Diſeaſes cauſe a remarkable change in the urine. Light, thin, watry urine, ſhews the perſon to be afflicted with internal ſpaſms, the hyſteric paſſion, the hypochondriac pains, the cardialgia, the ſtone or gravel, or convulſive colic. In diſeaſes of the head, ſuch as the vertigo, phrenſy, madneſs, melancholy, and epilepſy, the urine is always thin and light. It is likewiſe the ſame in the more grievous afflictions of the nerves from poiſon or worms. This ſtate of the urine not only happens in the fits, but ſome days before and after.

When the urine is thin, aqueous, and always white, it preſages danger in obſtinate diſeaſes: if it is copious in the ſtate of fevers, and before the criſis, it portends a phrenſy. In internal inflammations it is always dangerous, the more copious the worſe. After a dyſentery, a ſpotted fever, or the ſmall-pox, this kind of urine is common. In a cachexy, leucophlegmatia, enormous bleedings in the beginning of an anaſarca, in the green-ſickneſs, in a ſuppreſſion of the menſes, the urine is crude, turbid, pale, greeniſh, or of a light citron colour, and copious. In all preternatural febrile heats, the urine is yellow or red, and in ſmall quantities: ſuch kind of urine as is more or leſs red, or thin and light, or thick and heavy, is uſually in intermitting and continual fevers. In the fit, that is, in its exerbation or ſtate, the urine is thin, clear, and without ſediment. In an ardent and bilious fever, the urine is generally pellucid, but of a flame-colour. In intermittents after the fit, and on the well day, it is thick, and depoſits a ſediment. If this happens in continual fevers after the criſis, it ſhews the fever to be ended. If the ſediment is of a roſy or purple colour, it ſhews the blood is in fault, as is evident in continual fevers. When it is intenſely yellow, it ſhews that the bile is in fault. When it is brown or black, there is plenty of black bile, as in a ſcorbutic or miliary fever, and in quartans of a dangerous nature. When it is very plentiful, and full of viſcid and crude humours, in replete, obeſe, and ſpongy bodies, it ſhews the obſtinacy of an intermitting fever.

As it is a good ſign when the urine is thick and depoſits a ſediment, in fevers; ſo, on the contrary, if there is no ſediment in intermitting fevers, but the urine continues clear, and lets fall no ſediment in the cold fit, it is a very bad ſign. If, after the fit, it has no ſediment, but is pellucid, it is a very bad omen. In all inflammatory fevers, if the urine is clear and of a purple colour, or brown, and of a deep colour, frothy and without ſediment, it is a bad ſign. Likewiſe, it is always obſerved, that in a continual fever, if the urine is turbid, and does not grow clear either by the fire or reſt, nor depoſits a ſediment, it is a very dangerous preſage; it is likewiſe very bad, when in continual fevers, it is thick on the firſt days, and in the remainder, eſpecially the critical days, it is thin and without ſediment. In the decline of catarrhal fevers, and in the ſmall pox and meaſles, if the urine was clear and aqueous, but is now thick and high coloured, with a ſediment, it is a certain ſign that the diſeaſe remits.

In conſumptions, and all other violent and chronical diſeaſes, if the urine is thick, high-coloured, and a dark red, with a copious ſediment, and a fatneſs ſwims upon the urine, and adheres to the ſides of the urinal, the body at the ſame time waſting away, it is a ſign of a ſlow hectic fever, which is generally fatal. The like danger is threatened when in dropſical perſons the urine is like that of hectics,

hectics, for its ſcarcity is a ſign that the lympha is extravaſated into ſome cavity or porous ſubſtance; and if the colour is of a deep red, with a groſs ſediment, it ſhews the inteſtine motion and heat diſſolves the blood, that the liver is obſtructed; whence a bilious ſordes is ſeparated therefrom.

In chronical diſeaſes, without a fever, when the urine is thick, high-coloured, and of a reddiſh-brown, as well as heavy, as in the confirmed ſcurvy, gout, ſcorbutic palſy, and in extreme old age, as alſo in a nephritic paſſion, when the pains ceaſe, as well as in the yellow and black jaundice, it ſhews a plenty of ſaline and ſulphureous excrementitious parts, wherewith the blood and humours abound, and are not duly ſecreted therefrom, by reaſon of an obſtruction of the liver. Willis has obſerved, that patients dying of the ſcurvy have had their livers almoſt without blood, and like a cow's udder. In ſome the gall-bladder was either empty or full of ſtones, or very bitter filth.

When the urine is thick, of a deep colour, and dyes linen yellow, it is a ſign that the bile is obſtructed, or the duct conſtricted with a ſpaſm, whence the paſſage of the bile into the duodenum is hindred; whence it regurgitates by the lymphatic veſſels into the blood and lympha, and produces a jaundice, which proceeds from an impeded ſecretion of the bile in the liver.

Sometimes the urine is imbuted with an oily matter, and is made without noiſe, there are various colours on the ſurface, chiefly bluiſh, and it adheres ſo ſtrongly to the ſides of the urinal, that it cannot be waſhed off with a lixivious liquor This is a ſign of the colliquation of the fat: it ſhews a conſumption, an atrophy, and an hectic. Sometimes it is obſervable in fevers, and the oleous matter is more plentiful in proportion to the fatneſs of the body.

When the urine abounds too much with a tartarious matter, which is known by its adhering to the ſides of the chamber-pot, it is a ſign of a diſpoſition to the gravel and ſtone. When there is a ſmall ſand in the urine, it ſhews thoſe diſorders to be actually preſent. Sometimes ſhining yellow cryſtals are ſeen on the ſides of the pot, which is a ſign of arthritic or rheumatic pains. When the urine is bloody or whitiſh, from a mixture of pus loaded with a glutinous, thick, tenacious matter, of a bad ſmell, which ſinks to the bottom, and does not diſſolve by the agitation of the veſſel, it is a certain ſign of an ulcer in the kidneys or bladder. Sometimes, in the ſtone and ulcer of the bladder, it is like the white of an egg, and ſo tenacious that it will not divide, but fall from the veſſel at once.

In a chronical and malignant gonorrhœa, not only the proſtatæ, but often the bladder, is ulcerated; whence a thick and turbid urine, with a copious ſediment, which, when thrown on the fire, has a moſt fetid ſmell. Likewiſe, in the ſtone in the bladder, this, or its ſphincter, is ſo eroded, that the urine is thick and branny, with ſmall caruncles and filaments, which the vulgar take for worms. In the ſtrangury, there is a frequent ſtimulus to make water, which is little and muddy, ſharp and ſalt, with filaments; and then there is ſome ſpaſmodic diſorder affects the ſphincter. If blood is mixed with the urine, like the waſhings of fleſh or red-wine, but falls to the bottom, of a purple colour, it proceeds from the kidneys; but if it be of a browniſh-black, it comes from the veins of the bladder.

Incontinence of URINE. This is a term uſed by medical writers to expreſs an involuntary excretion of this liquor, whether it be inceſſantly, or in larger quantities at different intervals. This is of two kinds: in the one it is only in the night, in the time of ſleep; and this ariſes merely from careleſſneſs, and a bad habit: in the other, it depends on a paralytic affection of the ſpincter of the bladder: and in this caſe it drops away continually from the patient; and this is therefore called by ſome a ſtillicidium. Authors alſo divide an incontinence of urine into the idiopathic and ſymptomatic: the idiopathic is a diſeaſe in itſelf, and depends upon the preceding cauſes; the ſymptomatic happens to different perſons on different occaſions, as a ſymptom of other complaints. It is common to dying perſons; it is alſo very frequent to women who are big with child, and ſometimes happens from violent ſneezing, coughing, or laughing. The voiding of the urine involuntarily, and in the ſleep, in infants, is not to be accounted a diſeaſe; but when this cuſtom continues with them as they grow up, from idleneſs, or ill habit, it is at length to be conſidered as a diſeaſe, as they are by no means able to help it. Women who have ſuffered much in childbirth are often ſubject to an incontinence of urine afterwards, eſpecially perſons who have had their firſt child at an advanced age. People in years, who are ſubject to paralytic complaints, are alſo often afflicted with this troubleſome complaint; and many who have been cut for the ſtone by perſons not ſufficiently ſkilled in the operation. Perſons ſubject to the piles alſo ſometimes fall into it, from the ſuppreſſions of their uſual diſcharges, and ſometimes from the tumours becoming fiſtulous, and reaching to the neck of the bladder. Impoſthumes of the bladder will alſo occaſion it, and violent external injuries.

An incontinence of urine, which happens only in the night, and is merely cauſed by a bad habit, and not of long ſtanding, uſually admits of a cure; but the ſtillicidiums of urine, from paralytic diſorders of the ſphincter of the bladder, are very rarely cured, eſpecially when they have been fixed ſome time upon the perſon. The involuntary voiding the urine in the night, in children, is to be cured, in a great meaſure, with puniſhment for the neglect, and by

denying them much liquids after dinner-time; by a proper diet; the avoiding all diureties, and the making water immediately before going to bed; and when it has gone so far, that the tone of the parts is injured, the usual strengthening medicines are to be given, as in the following cases. When the incontinence of urine is occasioned by a paralytic weakness of the sphincter, nervous and strengthening medicines are the proper method of curing; in this case, mastic, amber, nutmeg, and cinnabar, are found to be of great service, and pills or powders compounded of them, are an excellent general remedy to be given in small doses, two or three times a day. Externally, it is very proper to use by way of fomentation, decoctions of rosemary, sage, serpyllum, marjoram, and the like warm herbs in red wine. When the disease is occasioned by an imposthume or ulcer in the neck of the bladder, balsamics are to be given, as mastic, gum-juniper, and boiled turpentine; but when it is owing to injuries received in child-birth, the manual operation of the surgeon is usually to be preferred to all internal medicines.

URINE, in agriculture, is of excellent use as a manure; and for land, trees, &c. is preferable to dung; as penetrating better to the roots, and removing divers infirmities of plants.

URINOUS SALTS, are the same with what we otherwise call alkali salts, or alkalies. See ALKALI.

URN, *urna*, a kind of vase, of a roundish form, but biggest in the middle, like the common pitchers, now seldom used but in the way of ornament over chimney-pieces, in buffets, &c. The great use of urns among the ancients was to preserve the ashes of the dead after they were burnt; for which reason they were called cineraria, and urnæ cinerariæ, and were placed sometimes under the tomb-stone whereon the epitaph was cut; and sometimes in vaults in their own houses. Urns were also used at their sacrifices to put liquid things in.

URN was also a Roman measure for things liquid. See the article MEASURE.

UROCRITERIUM, a casting of water; or giving judgment on diseases by the sight of the urine. See URINE.

URSA, in astronomy, the bear, a name common to two constellations of the northern hemisphere, near the pole; distinguished by major and minor.

URSA *Major*, or the great bear, according to Ptolemy's catalogue, consists of 35 stars; according to Tycho's, 56; but in the Britannic catalogue we have 215. The longitudes, latitudes, magnitudes, &c. are as follow.

Names and Situations of the Stars.	Signs.	Longitude. ° ′ ″	Latitude North. ° ′ ″	Magn.
Inform. between Perseus and head of the great bear	♊	11.41.11	31.34. 4	6
		12.57.27	30.56.54	5 6
		12.52.15	30.33.50	5
		14.54.32	34. 1.38	6
A star of ursa minor in Tycho		17.38.38	43.23.17	4 5
5.				
		15.49.45	32.23.17	6
		15.58.14	30.50.29	5
Of ursa minor		17.59.57	37.23.19	4 5
Of ursa minor		18.12. 5	35.53.15	5 6
		17.20. 4	28.33.30	5
10.				
		18.10. 6	30.35.42	6
Inform. between the pole and auriga		20.12. 3	34.52.27	6
Preced. the great bear		20.47.39	34.15.39	6
		22.13.55	33.52.	5 6
		23.28.51	40.44.23	6
15.				
		23.47.57	38.30.25	6 7
		24.20.	38. 1. 8	6
		23.54.41	33. 8.33	6
		24.27.45	32.39.56	5 6
		24.33.43	33.27.40	6 7
20.				
		25.29.32	35.29.38	6
		29.56. 5	36.24.34	5
		26.39.24	31.51. 2	6

Names and Situations of the Stars.	Signs	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ″	
		28.31.56	42.15.18	5 6
		28.17. 9	35.28. 5	5 6
25.				
		28.26.38	35.42.35	6 7
37th of Caſſiopeia in Tycho		29.10.15	45.52.52	4 5
		29. 9.27	36.33.18	6 7
		29.26.36	38. 4.30	5 6
Perhaps, 32d of Caſſiopeia in Tycho		29.40.56	35.34.58	4 5
30.				
	♓	3.43	38.20.59	6
		11.	35.57.43	5 6
		44.35	35. 3. 3	7
		51.	35.13. 1	6 7
		59.35	35. 2.30	6
35.				
		1.30.30	34.50.33	7
		2.27.12	38.13.19	5 6
		2.33.55	38.12.16	6
		2.51.12	33.34.54	6
		3.57.37	36.15.26	5 6
40.				
35th of Caſſiopeia		3.31.17	44.23.21	4 5
36th		3.39.13	45.43.33	4 5
32d		4.28.17	34. 47	6
34th		5. 2.18	36.21.17	5 6
		5.20.22	35.24.22	4 5
45.				
		7.35.11	22. 9.27	4 5
		7. 2	36.54.46	5 6
		7.23.32	37.57.49	6
		8.34.35	36.58. 2	5
		9. 7.50	36.17.15	6 7
50.				
		9.30.23	37.20.15	6
		10.58.58	26.58.23	5 6
		10.31.29	32.47.55	6
		12.18. 5	26.53.54	5
Inſ. fol. Auriga, bet. head of urſa maj. and gemini		12.19.26	37.25.55	6
55.				
		13. 3.53	35. 1.55	5 6
		13. 1. 5	36.41.20	4 5
		12.24. 1	40.48.30	5 6
		15.46.52	34.56.45	6
		17.42.59	25.58. 1	6
60.				
		17.42.47	26. 9.39	5 6
		15.27.40	38.40.	5 6
		17. 2.49	33.56.31	6
		13.54. 8	36.58.28	5 6
		17.37.18	39.21. 2	6
65.				
		18.11.39	38.38.21	5 6
		17.18. 8	41.30.16	6 7
		19.13.48	36.58.19	5 6
		18.33.11	39.50.13	6 7
Inform. between gemini and fore foot of the bear		24. 6.54	23. 2.58	4 5

Names and Situations of the Stars.	Signs	Longitude ° ′ ″	Latitude North. ° ′ ″	Magn.
70.				
In the tip of the noſe		19.39.28	40.12.47	4 3
Preced. of two againſt the eyes		18.19.32	44.33. 1	4 5
		19. 47	44.35.29	6
Subſeq. of the ſame		19.29.23	43.59.38	4
		28.25.19	17. 6.52	6
75.				
Againſt the jaw		22.36.	42.17.49	6
		21.41.31	44 53.29	5 6
		29.37.48	25. 2.44	4
Preced. of two in the forehead		20.39.10	47.54.43	3
North. in the preced. anterior foot		29.30.18	29.34.29	
80.				
North. of inform. under the anterior foot	♌	1.58.20	23.41.53	4 5
	♍	21.53.39	47.28. 3	6
South of the preced. foot	♌	37. 3	28.57.11	3
Poſterior in the forehead	♍	21.58.41	47.48. 5	5
Preced. in the triangle of the neck		24.15.30	44.33. 3	4
85.				
Second of the informes	♌	4.12.10	20.51.27	5
That under the preced. knee	♍	29.47.53	33.25.55	4 5
South. in the triangle of the neck		25.57.27	42.47.58	5
		28.39.29	38.35.45	5 6
	♌	3.57.59	25.49.20	5 6
90.				
That over the preced. knee	♍	29.58.12	36. 4.34	5
North. of the brighter among five inform.	♌	7.13. 2	20. 4.22	4
South. of the ſame		8.31. 1	17.53.58	3 4
		1.34.53	36.36.21	6 7
	♍	21. 4. 2	53.16.39	7
95.				
In extrem. of the ear		23. 38	51.13. 2	4 5
Poſterior in the triangle of the neck		27.29. 5	45. 7.19	4 3
	♌	1.26.16	38.26.25	6
		5.51.16	28.58.26	6
In the ſec. anterior knee		4. 30	34.56.30	3 4
100.				
A leſs over this		4. 6.16	35.20.16	4 5
	♍	21.54. 4	53.39.16	6
Laſt of five inform. under the anterior feet	♌	10.27.57	20.42.32	4 5
		11. 1.37	20.17.29	6
		9.48.39	24.40.	6
105.				
	♍	29. 8.57	46.25. 7	5
	♌	10.44.58	24 24. 4	6 7
	♍	29.38.28	46. 9.35	5
	♌	3.21.49	40.39.18	6
North. of two in the breaſt		2.56.55	42.39.11	4 3
110.				
South. of the ſame		6. 20	38.14.10	4
		8.52.11	34.37. 7	6
		5.41.45	41.11.33	6
		13.18.14	26.43.16	5 6
		17.42.35	18.32.33	5 6
115.				

Names and Situations of the Stars.	Signs.	Longitude ° ′ ″	Latitude North. ° ′ ″	Magn.
Preced. of inform. under the poſterior feet		17.40.51	22. 4.14	4 5
		2.28.23	49.27.46	5
North. in the preced. poſterior foot		16.13.22	29.52.27	4 3
		2.53.10	50.11.42	5
South. and poſterior in the ſame foot		17.54. 2	28.57.46	4 3
120.				
		3.34.45	50.35.12	6
Second of the informes under the poſterior feet		22. 5.21	22.13.20	5 4
Third and north of the ſame		21.13.16	25. 3 44	4 5
		11.16. 5	42.30.35	5
		11.13.49	43.45.37	6
125.				
		20.33.53	28.51.47	5
		5. 5.57	51.23.45	5 6
Prec. in baſe of an oxygon △ of inf. under bear's feet		25.31.37	21.36.55	4 3
		12.31.51	44.28.41	6
		19.21.58	34.49.14	5
130.				
		13. 5.54	44.23.38	6
		12.49.42	44.49.12	6
Subſeq. in the baſe of the oxygon		27.35.38	21. 3.23	4
		12. 5 14	46.48.33	6
		14.11.35	44.29. 4	6
135.				
		16. 1.41	42.57.58	5 6
In the apex of the oxygon. triangle		27.31.49	24.56. 4	4
In the preced. of poſterior leg		23.10. 5	33. 3.55	5 4
		27.59.12	24.54.27	6
		28.23.30	24.29.35	6
140.				
		25.46.14	31. 3.16	6
South. in ſq. of preced. or in the ſide		16. 4.12	45. 6.16	2
		26.39.15	30. 4.51	6 5
North. of preced. in the back		11.49.58	49.40. 5	2
		27.53.23	29.31.30	6
145.				
In the preceding poſterior knee		25.39.32	35.31.46	4 3
South. in the ſub. poſterior knee	♍	4. 37	24.46. 5	4
North. in the ſame knee		3.20.15	26. 9. 3	4
		52.42	30.46.34	5
	♌	28.38.30	35.46.45	6
150.				
	♍	2.16.32	32.41.24	5
	♌	21.41	36.12.	6
	♍	16.44.57	31.14.49	6
	♌	1.36.32	37.17. 9	6
		29.33.40	40. 4. 3	6
155.				
		21. 1.48	49.27. 1	6
	♍	7.30.15	29.15.46	6
	♌	11.43.46	56.11.51	6 7
	♍	8.54.52	27. 6.16	6
South. in the thigh	♌	21.15	41.32.23	4 5
160.				
		24.14. 2	48. 6.52	6

Names and Situations of the Stars.	Signs.	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ″	
Bright ſtar in thigh, the ſouth of the fol. in ſquare		27. 6.35	47. 7.26	2
		24.43.54	49.34.37	6 7
	♍	2.51.41	41.10.22	6 7
		6.44.25	38.58.35	5
165.				
	♎	26.35.54	51. 6.44	7
	♍	1. 5.37	48.46.41	7
In the reſt of the tail; north. of ſquare of the fol.	♎	27.40.40	51.39.36	3 2
	♍	11.52.24	38.34.36	6
In the ſouth. hip —— —— ——		5.51.53	45.37.34	5 6
170.				
	♎	27.34.28	52.41.36	6 7
	♍	11.28.30	40.35.50	6
North. in the hip —— —— ——		4.29.14	48. 6.48	5 4
	♎	29.37.25	52.13.50	7
	♍	14.13.35	37.46.	5
175.				
		59.48	51.38.32	6 7
	♎	28.30.45	53.53.12	6
	♍	5.40.31	48.40.22	6
That preced. the inform. under the tail ——		14.26.26	40.33.13	5 4
		15.45.13	40.37.42	7
180.				
	♎	24.53.31	57.57.46	6
	♍	18.12. 4	39.51.39	6
	♎	19.30.28	61. 3.41	6
	♍	20.27.18	38.51.12	6
Firſt of the tail —— —— ——		5.31.25	54.20.16	2
185.				
Bright ſtar under the tail, informes — —	♎	21.14.22	40. 7.53	2 3
		22.43. 1	60.52.51	6
		26.45.10	33.57.20	4 5
That foll. the firſt of the tail —— ——	♍	6.16. 3	55.14.19	5 6
		25. 1.51	38.54.37	5
190.				
		24. 7. 8	41.39.50	7
Inform. prec. Bootes between the tail of the bear and Coma Berenices —— —— ——		24. 4. 4	41.51.18	7
		24.13.27	41.40.11	6
		22.42.23	43.40.31	7
		23.54.18	43.27.29	5 6
195.				
		23.48. 7	44.14.22	7
Firſt of the two proced. the laſt of the tail ——		24.28.15	44.12.28	6
		16.54. 8	51.47. 4	5
		25.23.21	44. 6.33	6
Middle of three bright ones in the tail ——		12.18.59	56.23.14	2
200.				
That reſting, as it were, on the former ——		12.29 36	56.33.28	5
		6.22.51	60.22.20	5
That preced. the laſt of the tail —— ——		21. 55	52.52. 3	5
		13 48.	57.41. 5	7
Preced. in triangle over laſt of the tail — ——		17.53 28	56.26.27	6
205.				
North. in the ſame triangle —— ——		14.55.49	57.51.10	6

Names and Situations of the Stars.	Signs.	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ″	
	♑	2.38.22	45.17.23	7
		2.47.34	45.23.40	6
		7.58. 9	39. 6.27	6
	♐	17.25.24	58.14 26	6
210.				
Laſt of the tail —— —— ——		23.34.24	54.24.	2
	♑	6.20.16	42.31. 4	7
Informes towards Bootes's belt —— ——		6.25.42	42.25.12	7
		6.43.42	42.18. 3	6
Laſt of the triangle over the tail —— ——	♐	19.51.20	58.25.13	6
215.				

URSA *Minor*, the little bear, called alſo Charles's wain; and, by the Greeks, cynoſura; by its neighbourhood to the north pole, gives the denomination ἀρκλος (bear) thereto.

Ptolemy and Tycho make it to conſiſts of eight ſtars; but Mr. Flamſtead, of fourteen: the longitudes, latitudes, &c. of which, as laid down in the Britannic catalogue, are as follow.

Names and Situations of the Stars	Signs.	Longitude.	Latitude North.	Magn.
		° ′ ″	° ′ ″	
A ſmall one contiguous to the polar — — —	♊	24.26.40	66. 8. 4	7
That over the polar — — — — — —		18. 6.32	65.16.	6
The laſt of the tail; the pole ſtar — — —		25.14.41	66. 4.11	2
Preced. of two before the ſhoulder — — —		29.26.51	70.18.17	5
Subſeq. and more ſouth. — — — — —	♋	5. 9	71.25. 4	5
5.				
Bright one in ſhoulder, prec. of ſquare — —		9.54.40	72.58.10	2
In the breaſt, moſt ſouth. of the ſquare — —	♊	18.11.56	75.13.15	3
Preced. of two in the loins — — — —		26.45.45	74.41.52	6
Subſeq. of the ſame, north. of the ſquare — —		24. 2.11	75. 5.45	4 5
Preced. of two in the ſide — — — — —		27.27.42	77.24.10	5 6
10.				
Brighter in the ſide, ſubſeq. of ſquare — — —		26.56.25	77.49.28	4 5
In the root of the tail — — — — — —	♋	5.45. 5	73.53.36	4
Laſt but one of the tail — — — — —	♊	27.50.39	69.54.37	4
Another following this, nearer the pole — —		27.45.	69.31.27	7
14.				

URSULINES, in church-hiſtory, an order of nuns, founded originally by St. Angela of Breſcia, in the year fifteen hundred thirty ſeven, and ſo called from St. Urſula, to whom they were dedicated. They obſerve the rules of St. Auguſtine, and are chiefly noted for taking on them the education and inſtruction of young maids: their monaſteries are a kind of ſchools where young ladies of the beſt families receive their education. The habit of theſe religious is a gown of black ſerge, or other ſtuff, tied about with a girdle of black leather. The Urſulines are ſpread chiefly over France and Italy; and their different obſervances in their ſeveral monaſteries make them in truth ſo many diſtinct religious orders.

URSUS, the BEAR, in zoology. See the article BEAR.

URTICA, the nettle in botany. See the article NETTLE.

USANCE, *Uſo*, in commerce, is a determinate time fixed for the payment of bills of exchange, reckoned either from the day of the bills being accepted, or from the day of their date; and thus called becauſe regulated by the uſage and cuſtom of the places whereon they ate drawn.

Bills of exchange are drawn at one or more uſances, either from ſight or from date. The term is longer or ſhorter, according to the different countries. Uſance from London to any part of France, is thirty days; (this being declared to be a month, in regard to the exchanges, in this kingdom) whether the month has more or fewer in it. Uſance from London to Hamburgh, Amſterdam, Rotterdam, Middleburgh, Antwerp, Brabant, Zealand, and Flanders, and from theſe places to London, is one calender month after the date of the bill. Uſance, from London to Spain and Portugal, and from theſe places

to London, is two calendar months after date. Uſance from London to Genoa, Leghorn, Milan, Venice, and Rome, and from theſe places to London, is three months. See EXCHANGE.

Uſance of Amſterdam upon Italy, Spain, and Portugal, is two months: upon France, Flanders, Brabant, Geneva, and upon any place in the ſeven United Provinces, is one month. Upon Francfort, Nuremburgh, Vienna, Auſburgh, Cologne, Leipzic, and other places of Germany, as alſo upon Hamburgh and Breſlaw, is fourteen days after ſight: two uſances twenty-eight, and half uſance ſeven.

Uſance from Dantzic, Coningſberg, and Riga, upon Amſterdam, is at one month after ſight; tho' it is common to draw from the firſt at forty days date, and from the others at forty one, but oftener at ten and eleven. And from Amſterdam on the ſaid places at a month's date, without mentioning uſance; tho' ſometimes at forty and forty-one days; and ſometimes on Breſlaw at ſix weeks date. Moſt nations have generally agreed to allow the acceptor of a bill ſome ſmall time for payment beyond that mentioned in the bill, termed days of grace or reſpite; but they generally diſagree in the number and commencement of them.

USE, in law, the profit or benefit of lands and tenements; or a truſt and confidence repoſed in a perſon for the holding of lands, &c. that he to whoſe uſe the truſt is made ſhall receive the profits.

Uſes may be limited to a perſon and the wife he ſhall marry; and if the parties to a deed agree, and declare, that one of them ſhall make a feoffment, or levy a fine, to the uſe and intent that he ſhall hold the lands for his life, and after his deceaſe another intail, and afterwards a third in fee ſimple, &c. the eſtate ſettles according to the uſes in the deed.

The conveyances to uſes are ſaid to be of three ſorts, viz. a covenant to ſtand ſeized; a feoffment, fine or recovery to uſes; and a bargain and ſale; which laſt a contingent uſe cannot be ſupported by, though it may by the two firſt.

A ſuperſtitious uſe, is where lands or goods are deviſed to a prieſt to pray for the ſouls of the dead, &c. in which caſe they become forfeited to the king: and where ſuch an uſe is void, and the king cannot have the land, it ſhall not reſult to the heir at law; but it may be applied to charity.

USES *and Cuſtoms of the Sea*, are certain maxims or rules which form the baſis of maritime juriſprudence, by which the policy of navigation, and the commerce of the ſea are regulated.

The uſes and cuſtoms conſiſt of three kinds of regulations: the firſt called the laws or judgments of Oleron; the ſecond, regulations made by the merchants of Wiſbuy, a city in the iſland of Gothland, in the Baltic, antiently much famed for commerce; and the third, a ſet of regulations made at Lubec, by the deputies of the Hanſe towns.

USHER, an officer, or ſervant, who has the care and direction of the door of a court, hall, chamber, or the like.

In the king's houſhold there are two gentlemen uſhers of the privy-chamber, appointed to attend the door, and give entrance to perſons that have admittance thither; four gentlemen-uſhers, waiters; and eight gentlemen-uſhers, quarter-waiters in ordinary.

USHER, alſo ſignifies an officer of the court of Exchequer, of which there are four who attend the barons and chief officers of that court at Weſtminſter, as alſo juries, ſheriffs, &c. at the pleaſure of the court. There is alſo an uſher of the court of chancery.

USHER *of the Black-Rod*, the eldeſt of the gentlemen-uſhers, daily waiters at court, whoſe duty is to bear the rod before the king at the feaſt of St. George, and other ſolemnities: he has alſo the keeping of the chapter-houſe door, when a chapter of the order of the garter is ſitting; and, in time of parliament, attends the houſe of peers, and takes delinquents into cuſtody. He wears a gold badge, embelliſhed with the enſigns of the order of the garter.

USNEA, in botany, a genus of moſſes, wholly deſtitute of leaves, and compoſed only of long ſlender filaments, or ſtalks, which are uſually ſolid, rigid, and of a cylindric figure. The whole plants are fixed in the manner of miſleto to the barks of trees.

USQUEBAUGH, a ſtrong compound liquor, chiefly taken by way of dram.

There are ſeveral different methods of making this liquor; but the following is eſteemed one of the beſt: To two gallons of brandy, or other ſpirits, put a pound of Spaniſh-liquorice, half a pound of raiſins of the ſun, four ounces of currants, and three of ſliced dates; the tops of baum, mint, ſavory, thyme, and the tops or the flowers of roſemary, of each two ounces; cinnamon and mace, well bruiſed, nutmegs, aniſeeds, and coriander-ſeeds, bruiſed likewiſe, of each four ounces; of citron, or lemon and orange peel, ſcraped, of each an ounce: let all theſe infuſe forty-eight hours in a warm place, often ſhaking them together: then let them ſtand in a cool place for a week: after which the clear liquor is to be decanted off, and to it is to be put an equal quantity of neat white port, and a gallon of canary; after which it is to be ſweetened with a ſufficient quantity of double-refined ſugar.

USTION, in pharmacy, the preparing of certain ſubſtances by burning them.

USTULATION, *Uſtulatio*, a word uſed by pharmaceutic writers to expreſs the roaſting or torrefying of humid or moiſt ſubſtances over a gentle fire, ſo as to render them fit for powdering. The ſame word is alſo uſed by ſome for what we call burning of wine.

USUCAPTION, *Uſucaptio*, in the civil law, is an acquiſition of the property of a thing, by a poſſeſſion and enjoyment thereof for a certain term of years preſcribed by law.

USUFRUIT, *Uſus Fructus*, in the civil law, the uſe or enjoyment of any lands or tenements; or the right of receiving the fruits and profits of an inheritance, or other thing, without a power of alienating or changing the property thereof.

USURER, a perſon charged with a habit or act of uſury. See the article USURY.

USURIOUS CONTRACT, is any bargain or contract, whereby a man is obliged to pay more intereſt for money than the ſtatute allows.

USURPATION, in law, is an injurious uſing or enjoyment of a thing for continuance of time, that belongs of right to another.

USURY, *Uſura*, in the general, denotes a gain or profit, which a perſon makes of his money, by lending the ſame; of it is an increaſe of the principal, exacted for the loan thereof; or the price a borrower gives for the uſe of a ſum credited to him by the lender, called alſo intereſt; and in ſome ancient ſtatutes, dry-exchange.

The word uſury is generally taken in an evil ſenſe, viz. for an unlawful profit which a perſon makes of his money; in which ſenſe it is, that uſury is forbidden by the civil and eccleſiaſtical, and even by the law of nature.

By ſtat. 12 Ann. c. 16, which is called, The Statute againſt Exceſſive Uſury, it is ordained, that no perſon ſhall take for the loan of any money, or other thing, above the value of five pounds for the forbearance of one hundred pounds for a year; and ſo in proportion for a greater or leſſer ſum: and it is declared, that all bonds, contracts, and aſſurances, made for payment of any principal ſum to be lent on uſury, above that rate, ſhall be void; and that whoſoever ſhall take, accept, or receive, by way of corrupt bargain, loan, &c. a greater intereſt than that laſt above-mentioned, ſhall forfeit treble the value of the money lent; and alſo, that ſcriveners, ſolicitors, and drivers of bargains, ſhall not take or receive above five ſhillings for the procuring the loan of one hundred pounds for one year, on pain of forfeiting twenty pounds, &c.

There can be no uſury without a loan, between which and a bargain the court has diſtinguiſhed: and though a perſon is to pay double the ſum borrowed, &c. by way of penalty, for the non-payment of the principal debt, it is not uſury; ſo it alſo is in reſpect to the grant of an annuity for lives, or on condition, where it exceeds the uſual intereſt, and the proportion attending contracts of this kind. Even if one ſecures a large intereſt and principal, and it is at the will of the party who is to pay; or where it happens that both the principal money and extraordinary intereſt are in hazard, or that a perſon may have leſs than his principal; as when a bond is made to pay money upon the return of a ſhip from ſea, &c. either of theſe caſes are not held to be uſury.

In an action brought for uſury, the ſtatute made againſt it muſt be pleaded; and in pleading an uſurious contract, as a bar to an action, the whole matter is to be ſet forth ſpecially, becauſe it lies within the parties own privity; yet on an information on the ſtatute for making ſuch contract, it is ſufficient to mention the corrupt bargain generally; becauſe matters of this kind are ſuppoſed to be privily tranſacted; and ſuch information may be brought by a ſtranger. 1 Hawk. P. C. 248.

Likewiſe upon an information on the ſtatute againſt uſury, he that borrows the money may be a witneſs, after he has paid the ſame.

UT, a Latin term, literally ſignifying *as*, much uſed in ſtating of ratios and proportions.

UT, in muſic, the firſt of the muſical notes, which, with the reſt, was taken out of the hymn of St. John Baptiſt, *Ut queant laxis*, &c. See the article SCALE, MUSIC, &c.

UTENSIL, *Utenſile*, a little domeſtic moveable, belonging principally to a kitchen: ſuch are pots pans, &c.

Utenſils are more particularly uſed in war, for the moveables which the hoſt is obliged to furniſh the ſoldiers, quartred with him; which are, a bed with bed clothes, a pot, and a ſpoon.

UTERINE, *Uterinus*, ſomething belonging to the uterus, or womb of a woman.

Furor UTERINUS, in medicine, denotes a kind of madneſs, attended by laſcivious ſpeeches and geſtures, and an invincible inclination to venery. See FUROR.

UTERUS, the womb, in anatomy, a hollow body, called alſo the matrix, of a form approaching to that of a pear, ſituated between the bladder and the rectum, and deſtined to the office of generation, for the containing the fœtus. It is connected in the anterior part with the vagina, and at its lateral part by the ligaments, lata and rotunda, being looſe in its hinder part.

In women not with child, the length of the uterus is about three inches; its breath, in the upper part, being about two inches, and in the lower part one. Its thickneſs is about an inch and an half: in virgins, indeed, it is much ſmaller than this; but in women with child it is of a different ſize, according to the different time of geſtation.

Anatomiſts divide it into two parts; the upper and broader part they call the fundus uteri, and the lower they call the cervix, into which it it is that the vagina opens. See the article VAGINA.

The orifice, or, as it is otherwiſe called, the internal mouth of the womb, opens into the vagina, in

in form of the glans penis in man: it is very ſmall in virgins, but in women who have had children, or who are with child, it is larger; and in the laſt it is always cloſed up with a glutinous humour: in the time of delivery, it in a wonderful manner expands itſelf, ſo as to give paſſage to the child. See the article DELIVERY.

The ſubſtance of the womb is muſculous, being compoſed of a various plexus of fleſhy fibres, with a great number of veſſels between. In women not with child, it is compact and firm; in thoſe with child, it is ſpongy and ſinuous, and is capable of wonderful dilatation, without any diminution of its thickneſs. It is covered externally with a membrane from the peritonæum; and internally, its cavity is lined with a porous and nervous membrane: this cavity is very ſmall in virgins; and in women with child, the inner membrane almoſt entirely diſappears.

The blood-veſſels of the uterus are tortuous, and make a thouſand anaſtomoſes with one another: they open by a number of little mouths into the uterus and vagina, and are the ſources of the menſtrual diſcharge in women. See the article MENSES.

The arteries are of three kinds, viz. ſpermatics from the aorta; very large ones from the hypogaſtrics; and others from the hæmorrhoidal arteries. The veins of the uterus are alſo of three kinds, and of the ſame denominations: they have valves and are greatly larger than the arteries, eſpecially in women with child. The nerves of the womb are from the intercoſtals, and thoſe of the os ſacrum. The lymphatics have long ſince been diſcovered in brutes; but Morgagni has of late years found them alſo in human ſubjects.

UTILE, a Latin term, ſignifying profitable or uſeful; in which ſenſe it is ſometimes uſed by Engliſh writers.

UTRICULARIA, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the upper lip is flat, obtuſe, and erect; the lower one is large, plane, and intire, with a heart-ſhaped palate and a corniculated nectarium: the ſtamina are two very ſhort and incurved filaments, topped with ſmall coherent antheræ: the fruit is a large, globoſe, unilocular capſule, containing a number of ſmall ſeeds.

UVARIA, in botany, a genus of plants, whoſe flower conſiſts of ſix lanceolated, ſeſſile, patent petals; the ſtamina hath no filaments, but conſiſts of a number of truncated oblong antheræ: the fruit is compoſed of many diſtinct, globoſe, pedunculated berries, affixed to an oblong receptacle; and the ſeeds are numerous.

UVA URSI, in botany, a name uſed by Tournefort for a ſpecies of arbutus. See the article ARBUTUS.

UVEA, in anatomy, the third or outermoſt coat of the eye. See EYE.

VULCANO, or VOLCANO, in natural hiſtory, a burning mountain, or one that vomits forth fire, flame, aſhes, cinders, &c.

As to the cauſe of vulcanos, it is found by experience, that there are ſeveral inflammable bodies, which, being mixed together in due proportion, will kindle into flame by fermentation alone, without the help of any fiery particles. Thus M. Lemery having covered up in the earth about fifty pounds of a mixture, compoſed of equal parts of ſulphur and filings of iron, tempered with water; after eight or nine hours time, the earth, where it lay, vomited up flames. From this experiment, we ſee the true cauſe of the fire of Ætna, Veſuvius, and other burning mountains, which probably are made up of ſulphur and ſome other matter proper to ferment with it, and take fire.

VULGATE, a very ancient Latin tranſlation of the Bible, and the only one the church of Rome acknowledges authentic.

The ancient vulgate of the Old-Teſtament was tranſlated almoſt word for word from the Greek of the LXX. The author of the verſion is not known, nor ſo much as gueſſed at.

VULGATE *of the New-Teſtament*. This the Romaniſts generally hold preferable to the common Greek text, in regard it is this alone, and not the Greek text, that the council of Trent had declared authentic. Accordingly, that church has, as it were, adopted that edition. The prieſts read no other at the alter, the preachers quote no other in the pulpit, nor the divines in the ſchools.

VULNERARY, an epithet given to remedies proper for the cure of wounds and ulcers.

All medicines of this intention are ſuppoſed both to cleanſe and heal; that is, incarnate, or fill up with new fleſh, all ulcerations and foulneſſes. Under this head are ranged all ſuch balſamics as are not only ſoftening and adheſive, but alſo, by a peculiar activity, joined with a ſuitable configuration of parts, are apt to abrade and carry along with them what particles they lay hold on in their paſſage.

VULTURE, a genus of birds, the characters of which are as follow: there are four toes in each foot, and three of theſe are placed forwards: the neck is long, and almoſt bare of feathers: the legs are covered with feathers down to the feet, or nearly ſo; and under the throat there is a ſpace covered with hairs inſtead of feathers; the head alſo, in many ſpecies, is naked, and has at the moſt only a downy matter on it, inſtead of feathers; and the under part of the wings is downy.

This genus comprehends the black vulture, the bœtic vulture, the hare-catcher, the golden breaſted vulture, the brown vulture, and Braſilian vulture.

VULVA, in anatomy, a name given as well to the uterus, or womb, as to the cunnus, or pudendum muliebre. See the articles PUDENDUM and UTERUS.

VULVARIA, in botany, the name of a ſpecies of

of Chenopodium. See the article CHENOPODIUM.

This plant has always been held in great eſteem by the ancient as well as modern hiccobites, particularly on their feſtival days.

UVULA, in anatomy, a round, ſoft, ſpongeous body, like the end of a child's finger, ſuſpended from the palate, near the foramina of the noſtrils, perpendicularly over the glottis. Its uſe is to break the force of the cold air, and prevent its entering too precipitately into the lungs. It is formed of a duplicature of a membrane of the palate; and is called, by ſome authors, columella, and by others gurgulio.

It is moved by two pair of muſcles, and ſuſpended by as many ligaments.

UVULARIA, in botany, a genus of plants, whoſe flower conſiſts of ſix oblong, erect, lanceolated petals, with an oblong nectarium cut into the baſe of each petal; the ſtamina are ſix very ſhort filaments, topped with long erect antheræ; the fruit is an ovato-oblong trilocular capſule, containing many roundiſh compreſſed ſeeds.

W.

W The twenty-firſt letter of our alphabet, and is compoſed, as its name implies, of two V's. It was not in uſe among the Hebrews, Greeks, or Romans, but chiefly peculiar to the northern nations, the Teutones, Saxons, Britons, &c. But ſtill it is not uſed by the French, Italians, Spaniards, or Portugueſe, except in proper names, and other terms borrowed from languages in which it is originally uſed, and even then it is ſounded like the ſingle V.

This letter is of an ambiguous nature, being a conſonant at the beginning of words, and a vowel at the end. It may ſtand before all the vowels except *u*, as *water*, *wedge*, *winter*, *wonder*: it may alſo follow the vowels *a*, *e*, *o*, and unites with them into a kind of double vowel, or diphthong, as in *ſaw*, *few*, *cow*, &c. It alſo goes before *r*, and follows *s*, and *th*; as in *wrath*, *ſwear*, *thwart*: it alſo goes before *h*, though in reality it is ſounded after it, as in *when*, *what*, &c. In ſome words it is obſcure, as in *ſhadow*, *widow*, &c.

WACHENDORFIA, in botany, a genus of plants, whoſe flower-cup is a bivalvular ſpatha; the corolla conſiſts of ſix oblong petals; the three upper ones are erect, and the others open wide: the ſtamina are three ſlender declining filaments, terminated with incumbent antheræ: the fruit is an oval, obtuſe, triquetrous capſule, with three cells, containing in each one hairy ſeed.

WADD, or WADDING, is a ſtopple of paper, hay, ſtraw, or the like, forced into a gun upon the powder, to keep it cloſe in the chamber; or to put up cloſe to the ſhot, to keep it from rolling out.

WAFT. To waft a ſhip, is to convoy her ſafe, as men of war do merchant ſhips. To make a waft, is to hang out ſome coat, ſea-gown, or the like, on the main-ſhrowds of the ſhip, as a ſignal for people to come aboard, and ſignifying that the ſhip is in great diſtreſs.

WAFERS, or *Sealing*-WAFERS, are made in the following manner: Take very fine flour, mix it with glair of eggs, iſinglaſs, and a little yeaſt; mingle

mingle the materials; beat them well together, ſpread the batter, being made thin with gum-water, on even tin plates, and dry them in a ſtove; then cut them out for uſe.

You may make them of what colour you pleaſe, by tinging the paſte with Braſil or vermilion for red; indigo or verditer, &c. for blue; ſaffron, turmerics, or gamboge, &c. for yellow. See the article *Sealing*-WAX.

WAGGON, a vehicle or carriage, of which there are various forms, accommodated to the different uſes they are intended for.

The common waggon conſiſts of the ſhafts or rads, being the two pieces which the hind horſe bears up; the welds; the ſlotes, or croſs-pieces, which hold the ſhafts together; the bolſter, being that part on which the fore-wheels and the axle-tree turn, in wheeling the waggon acroſs the road; the cheſt, or body of the waggon, having the ſtaves or rails fixed thereon; the bales, or hoops, which compoſe the top; the tilt, the place covered with cloth, at the end of the waggon. For the principiples on which this carriage is conſtructed, ſee the article WHEEL.

WAGTAIL, in ornithology, the name of two different ſpecies of motacilla. See the article MOTACILLA.

WAIF, or WAFE, in law, a term applied to ſuch goods as a thief having feloniouſly ſtolen, on his being cloſely purſued, are waifed or left by the felon, which become forfeited to the king, or lord of the manor: and ſo it alſo is where a felon has the goods in his cuſtody, and apprehending that purſuit is made, he flies, and leaves them behind him.

Though waif is properly applied to goods that are ſtolen, yet it may be alſo ſaid of goods not ſtolen or taken away, as where a perſon is purſued with hue-and-cry as a felon, and he flies and leaves his own goods; in this caſe theſe ſhall be forfeited as ſtolen goods, or what are uſually called fugitives goods.

WAIF, is alſo applied to things loſt, and eſtrays, which, no owner appearing, are forfeited to the lord of the manor, after they have been cried and publiſhed in the markets.

WAINSCOT, in building, the timber-work that ſerves to line the walls of a room, being uſually made in pannels, and painted, to ſerve inſtead of hangings.

It is uſual, even in halls, to have wainſcot breaſt high, by reaſon of the natural moiſtneſs of the walls. Some joiners put charcoal behind the pannels, to prevent the ſweat of the ſtone and brick walls from ungluing the joints; others uſe wool for the ſame purpoſe; but the only ſure way is to prime over the back ſides of the joints with white-lead, Spaniſh brown, or linſeed-oil.

The wainſcotting with Norway oak, according to Neve, (the workman finding ſtuff) is valued at 6 or 7 *s.* per yard ſquare; plain ſquare wainſcotting, the workman finding deal, is valued at 3 *s.* and 3 *s.* 6 *d.* per yard. Ordinary biſſection wainſcotting, the workman finding deal, is worth 3 *s.* 6 *d.* and 4 *s.* per yard. Large biſſection wainſcotting, with Dantzic ſtuff, is valued at 6 or 7 *s.* per yard.

WAIVE, according to the different acceptation of the word, ſignifies to forſake; but in the law, it is eſpecially applied to a woman, who, for any crime for which a man may be outlawed, is termed waive.

WAIVER, in law, denotes the paſſing by of a thing, or a refuſal to accept thereof; and relates ſometimes to an eſtate conveyed to a perſon, and ſometimes to a plea.

It is held, where a particular eſtate is granted with a remainder over; in that caſe, he that has it, may not regularly waive it to the damage of him in remainder; though where one has the reverſion, it is otherwiſe, for that is not hurt by ſuch waiver.

WAKE *of a Ship*, is the ſmooth water aſtern when ſhe is under ſail: this ſhews the way ſhe has gone in the ſea, whereby the mariners judge what way ſhe makes.

If the wake be right aſtern, they conclude ſhe makes her way forwards; but if the wake be to leeward a point or two, then they conclude ſhe falls to the leeward of her courſe. When one ſhip, giving chaſe to another, is got as far into the wind as ſhe can, and ſails directly after her, they ſay, ſhe has got into her wake.

A ſhip is ſaid to ſtay to the weather of her wake, when in her ſtaying, ſhe is ſo quick, that ſhe does not fall to leeward upon a tack, but that when ſhe is tacked, her wake is to the leeward; and it is a ſign ſhe feels her helm very well, and is quick of ſteerage.

WAKE, is the eve feaſt of the dedication of churches, which is kept with feaſting and rural diverſions.

WAKE-ROBIN, *Arum*, in botany. See the article ARUM.

WALE, or WALES, in a ſhip, thoſe outermoſt timbers in a ſhip's ſide, on which the ſailors ſet their feet in climbing up.

They are reckoned from the water, and are called her firſt, ſecond, and third wale, or bend. See the article SHIP.

WALE-KNOT, a round knot, or knob, made with three ſtrands of a rope, ſo that it cannot ſlip, by which the tacks, top-ſail ſheets, and ſtoppers, are made faſt, as alſo ſome other ropes.

WALE REARED, on board a ſhip, a name the ſeamen give to a ſhip, which, after ſhe comes to her bearing, is built ſtraight up: this way of building, though it does not look well (nor is, as the ſeamen term it, ſhip-ſhaped) yet it has this advantage, that

that a ſhip is thereby more roomy within board, and becomes thereby a wholeſome ſhip at ſea, eſpecially if her bearing be well laid out.

WALK, in gardening, an ornamental and uſeful part of a garden, differing from an alley by being wider. See ALLEY.

Walks are either ſtrait or ſerpentine; the materials of which they are formed are gravel, ſand, or graſs; but where gravel or ſand cannot be procured they are ſometimes laid with powdered coal, ſea-coal aſhes, and ſometimes with powdered brick, but none equals thoſe made with gravel: and in order to the laying thoſe kind of walks, it is very proper to fill the bottom with lime, rubbiſh, flint ſtones, coarſe gravel, or other rocky materials, which will be of ſervice to prevent weeds from growing thro' the gravel, and to hinder worm-caſts; this bottom ſhould be ten inches or a foot thick, over which the coat of fine gravel, mixed with a due proportion of loam, ſhould be laid, to the thickneſs of ten inches. The common allowance for a gravel walk of five feet breadth is an inch in the crown, ſo that if a walk be twenty feet wide, it ſhould be four inches higher in the middle than on each ſide.

When a walk has been evenly laid, trodden down, and raked, it ſhould then be rolled well both in length and width; and in order to make them more firm, it will be neceſſary to give them three or four water-rollings, that is, they ſhould be rolled when it rains very faſt; this will cauſe the gravel to bind, ſo that when the walks come to be dry, they will be as hard as terrace.

Gravel walks are not only very neceſſary near the houſe, but there ſhould always be one carried quite round the garden, becauſe being ſoon dry after rain, they are proper for walking on in all the ſeaſons; but then theſe ſhould be but few, and thoſe adjoining to the houſe ought to be large in proportion to the ſize of the houſe and garden: the principal of theſe walks ſhould be elevated, and carried parallel with the houſe ſo as to form a terrace; this ſhould extend itſelf each way in proportion to the width of the garden, ſo that from this there may be a communication with the ſide walks, whereby there may be dry walking all round the garden. For farther particulars concerning gravel walks, ſee the article GRAVEL.

Sand walks are alſo frequently made in gardens; theſe are leſs expenſive in the making, and alſo in keeping in order than thoſe of gravel, for as the greateſt part of the walks which are made in modern gardens twiſt about in an irregular ſerpentine manner, it would be very difficult to keep them handſome if they were laid with gravel, eſpecially where they are ſhaded by trees; for the dripping of the water from their branches in hard rains is apt to waſh the gravel in holes and render the walks very unſightly, therefore thoſe walks which go through woods and plantations are much better if laid with ſand, which will be dry and wholeſome, and whenever they appear moſſy, or any weeds begin to grow on them, if they are ſcuffled over with a Dutch hoe in dry weather and raked ſmooth, it will deſtroy the moſs and weeds, and make the walks appear as freſh and handſome as when firſt laid.

The breadth of theſe walks ſhould be proportioned to the ſize of the ground, which, in a large extent, may be twelve or fourteen feet wide, but in ſmall gardens five or ſix will be ſufficient.

The ground being traced out in the manner as the walks are deſigned, the earth ſhould be taken out of the walk and laid in the quarters; the depth of this muſt be proportioned to the nature of the ſoil, for where the ground is dry, the walks need not be elevated above the quarters, ſo the earth may be taken out four or five inches deep in ſuch places; but where the ground is wet, the bottom of the walks need not be more than two inches below the ſurface, that the walks may be raiſed ſo high as to throw off the wet into the quarters, which will render them more dry and healthy to walk on: after the earth is taken out, the bottom of the walks ſhould be laid with rubbiſh, coarſe gravel, &c. to the thickneſs of five or ſix inches, and beaten down cloſe, to prevent the worms from working through it; then the ſand ſhould be laid upon this about three inches thick, and after treading it down, it ſhould be raked over to level and ſmooth the ſurface: the ſand that is fitting for this purpoſe ſhould be ſuch as will bind, otherwiſe it will be very troubleſome to walk on them in dry weather; for if the ſand be of a looſe nature, it will be moved by ſtrong gales of wind, and in dry weather will ſlide from under the feet; and if it is too much inclinable to loam, it will alſo be attended with as ill conſequence as that which is too looſe, for this will ſtick to the feet after every rain; ſo that where ſand can be obtained of a middle nature, it ſhould always be prefered.

Graſs walks in gardens were formerly held in great eſteem, and were looked upon as neceſſary ornaments to a garden; but of late years they have been much leſs regarded; for theſe long narrow ſlips of graſs are far from being pleaſing to the eye, and are for the greateſt part of the year uſeleſs, being generally too damp for perſons of tender conſtitutions to walk on; and whenever they were conſtantly uſed, they became bare in the places frequently trodden, ſo were rendered more unſightly; and as the intention of walks in gardens is to have at all ſeaſons a dry communication through them for exerciſe and recreation, graſs walks were very improper, becauſe every ſhower of rain made them ſo wet, as not to be fit for uſe for a conſiderable time, and the dews rendered them too damp to walk on either in the morning or evening, and if they are not kept conſtantly cloſe mowed, then they become not only unhealthful but troubleſome to the feet; beſides

beſides, whenever the ground is ſo dry, as that perſons may with ſafety walk upon graſs, the lawns and other parts of verdure in gardens are better adapted for uſe than any of theſe formal ſtiff walks, which were ſo much eſteemed in the laſt age.

WALK, in the manege, is the ſloweſt, and leaſt raiſed of all a horſe's goings. It is performed by a horſe's lifting up his two legs on a ſide, the one after the other, beginning with the hind leg firſt. Thus, if he leads with the legs of the right ſide, then the firſt foot he lifts is the far hind-foot, and in the time he is ſetting it down, (which in a ſtep is always ſhort of the tread of his fore-foot on the ſame ſide) he lifts his far fore-foot, and ſets it down before his near fore-foot. Again, juſt as he is ſetting down his far fore-foot, he lifts up his near hind-foot, and ſets it down again juſt ſhort of his near fore-foot; and juſt as he is ſetting it down, he lifts his near fore-foot, and ſets it down beyond his far fore-foot.

WALL, in architecture, the principal part of a building, as ſerving both to incloſe it, and ſupport the roof, floors, &c.

Walls are diſtinguiſhed into various kinds, from the matter whereof they conſiſt, as plaſtered or mud walls, brick-walls, ſtone-walls, flint, or boulder walls, and boarded walls. In all which theſe general rules are to be regarded. 1. That the right angle therein depending is the true cauſe of all ſtability, both in artificial and natural poſition. 2. That the maſſieſt and heavieſt materials be the loweſt, as fitter to bear than to be borne. 3. That the walls, as they riſe, diminiſh proportionably in thickneſs, for eaſe both of weight and expence. 4. That certain courſes or ledges, of more ſtrength than the reſt, be interlaid, like bones, to ſtrengthen the whole fabrick.

Brick-walls are the moſt important and uſual amongſt us. In theſe, particular care is to be taken about laying of the bricks; that in ſummer they be laid as wet, and in winter as dry, as poſſible, to make them bind the better with the mortar: that in ſummer, as faſt as they are laid, they be covered up, to prevent the mortar, &c. from drying too faſt: that in winter they be covered well to protect them from rain, ſnow, and froſt, which are all enemies to mortar: that they be laid joint on joint in the middle of the walls as ſeldom as may be: but that good bond be made there as well as on the outſide. Care is to be taken that the angles be firmly bound, which are the nerves of the whole edifice. In order to which, in working up the walls of a building, it it is not adviſeable to raiſe any wall above eight feet high, before the next adjoining wall be brought up to it, that ſo good bond may be made in the progreſs of the work; it may be worth notice, that a wall a brick and a half thick, with the joint, will be in thickneſs fourteen inches, or very near; whence 150 or 160 bricks will lay a yard ſquare meaſured upon the face of the building; and to the ſquare of ten feet are uſually allowed 1700 or 1800 bricks. Flint, or boulder walls, are much uſed in ſome parts of Suſſex and Kent, for fence-walls, round courts, gardens, &c. A right and left-handed man fits well for this work, as they have a hod of mortar poured down upon the work, which they part between them, each ſpreading it towards himſelf, and ſo they lay in the flints. The mortar for this work muſt be very ſtiff.

WALL, in gardening. Of all materials for building walls for fruit-trees, brick is the beſt; it being not only the handſomeſt, but the warmeſt and kindeſt for the ripening of fruit; and affording the beſt conveniency for nailing, as ſmaller nails will ſerve in brick than will in ſtone walls, where the joints are larger; and if the walls are coped with free-ſtone, and ſtone pilaſters or columns at proper diſtances, to ſeparate the trees, and break off the force of the winds, they are very beautiful, and the moſt profitable walls of any others.

In ſome parts of England there are walls built both of brick and ſtone, which are found very commodious. The bricks of ſome places are not of themſelves ſubſtantial enough for walls; and therefore ſome perſons, that they might have walls both ſubſtantial and wholeſome, have built theſe double, the outſide being of ſtone, and the inſide of brick: but there muſt be great care taken to bind the bricks well into the ſtone, otherwiſe they are very apt to ſeparate one from the other, eſpecially when froſt comes after much wet.

There have been ſeveral trials made of walls built in different forms; ſome of them having been built ſemicircular; others in angles of various ſizes; and projecting more towards the north, to ſcreen off the cold winds: but there has not as yet been any method which has ſucceeded near ſo well as that of making the walls ſtrait, and building them upright. Where perſons are willing to be at the expence, in the building of their walls ſubſtantial, they will find it anſwer much better than thoſe which are ſlightly built, not only in duration, but in warmth: therefore a wall two bricks thick, will be found to anſwer better than one of a brick and a half: and if in building of garden-walls they are grouted with ſoft mortar, to fill and cloſe all the joints, the walls will be much ſtronger, and the air will not ſo eaſily penetrate, as it does through thoſe which are commonly built.

For the aſpect or ſituation of garden-walls, ſee the article EXPOSURE.

Hot-WALL. See the article FORCING.

WALL-FLOWER, *Leucojum*, in botany, is included by Linnæus among the cheiranthus. See CHEIRANTHUS.

Of wall-flowers there are ſeveral varieties; as the yellow wall-flower, the bloody wall-flower, the white wall-flower, and the double yellow, white, and bloody wall-flowers: they are eaſily propagated from

from ſeeds (except the double ones) either by ſowing when the ſeeds are ripe, or in the ſpring; thoſe which produce double flowers are raiſed from ſlips, which ſhould be planted in a ſhady ſituation, either in April or May, which, when ſufficiently rooted, may be tranſplanted where they are intended to blow; theſe flowers appear in the ſpring, and are much admired for their fragrancy.

WALNUT-TREE, *Juglans*, in botany, a genus producing male and female flowers on the ſame tree; the male flowers are diſpoſed in an oblong, cylindrical, imbricated amentum; the corolla of each flower is divided into ſix plane, equal, and elliptic parts, in the center of which is ſituated a number of very ſhort filaments, topped with erect, acuminated antheræ; the female flowers grow in ſmall cluſters, ſitting cloſe to the branches; the corolla of each is divided into four erect pointed ſegments; the fruit is a large, oval, dry, and unilocular drupe, incloſing a large oval nut with netted furrows, containing a kernel with four lobes, which are variouſly furrowed.

The wallnut-tree grows to a very large ſize; the trunk is covered with a thick bark of a greeniſh aſh colour, and ſmooth; but when it grows old, it is full of longitudinal indentures; the leaves are diſpoſed in wings, five, ſix, or ſeven adhering to one rib, conſiſting of conjugations with a ſingle leaf at the end; at firſt they are tender, reddiſh, and have a ſweet ſmell, but when they are full grown they are ſmooth, ſlightly ſerrated, of a beautiful green, with a ſtrong ſcent, and of an aſtringent taſte: the flowers appear late in the ſpring, and the fruit is ripe in autumn.

There are different kinds of wallnuts, as the large wallnut, the thin-ſhelled wallnut, the hard-ſhelled wallnut, the late ripe wallnut, the French wallnut, the double wallnut; beſide theſe there are ſeveral ſorts of American wallnuts; but the two firſt mentioned kinds are moſt commonly propagated for their fruit and timber. The trees are raiſed from the nuts; and in order to obtain ſuch as are good, choice ſhould be made of thoſe which have the ſweeteſt kernel and thinneſt ſhell. When the nuts are ripe they ſhould be gathered and preſerved in ſand till February, at which time they may be planted in good freſh land that is not hot and dry, at the diſtance of about ſix inches and three in depth; at the end of two years the plants may be taken out of the ſeed beds, pruning off only the downright roots, without cutting the branches, and tranſplanted; but this is to be underſtood of thoſe which are planted for the ſake of the fruit only; but if they are deſigned for timber, it is better to plant the nuts where the plants are intended to perfect themſelves, without any removal. The beſt ſeaſon for tranſplanting wallnut-trees is as ſoon as the leaves begin to decay, which may be done till they are eight or nine years old; but they will not grow ſo large or continue ſo long as thoſe which are removed young. Theſe trees delight in a good rich loam where there is a proper depth; they ſhould be placed at leaſt forty feet aſunder when any regard is had to the fruit, but when for timber, they ſhould ſtand nearer each other, becauſe it promotes their upright growth.

The wood of the wallnut-tree is well known for vaneering or covering curious cabinets, cheſts of drawers, and the like; that of the black Virginian wallnut is moſt eſteemed for theſe purpoſes, it being of a more beautiful grain, and more finely variegated than that of the common ſort, it is alſo more durable, being rarely infected with inſects of any kind, which may proceed from its extraordinary bitterneſs; but it is not fit for buildings of ſtrength, being of two brittle a nature.

The inner bark of the wallnut-tree is a ſtrong vomit, but the catkins are more gentle; ſome account the leaves an excellent cataplaſm againſt the gout; the juice of the root is a violent purge, unleſs it proceeds from the wounded root in February, and then it is recommended in chronic diſeaſes, eſpecially in the gout, gravel, and head-ach; the green outer rind is aſtringent, and is ſaid by ſome to have an emetic faculty, when freſh; the pith powdered and given to a dram, is good againſt the cholic and fluxes of the belly.

WALRUS, in zoology, the Engliſh name of the phoca, with canine teeth exerted. See the article PHOCA.

This is much larger than the ſea-calf, or phoca, with the canine teeth covered; growing to the ſize of the largeſt ox; the head is very large, and almoſt of a rounded figure; the eyes are large and prominent; there are no ears, but only an aperture on each ſide of the head, of an oblong form, and not very large; the noſe is obtuſe; the noſtrils large, and the creature contracts and dilates them at pleaſure; the mouth is very large, and the upper part of it furniſhed with thick and cartilaginous whiſkers; the tongue is ſhort, the canine teeth of the upper jaw are of an enormous length and ſize, and they hang downwards and forwards toward the breaſt; the creature uſes theſe ſtrange weapons to climb upon the ice, and to hang itſelf to the rocks in its getting on ſhore to ſleep.

WALTHERIA, in botany, a genus of plants, whoſe flower conſiſts of five heart-ſhaped ſpreading petals, and the ſame number of ſhort ſtamina joining at their baſe: the fruit is an oval unilocular capſule, containing an obtuſe ſeed, which is broadeſt at the top.

WANLASS, in hunting. Driving the wanlaſs, is the driving of deer to a ſtand, that the lord may have a ſhoot, which is one of the cuſtomary ſervices of fiefs.

WAPENTAKE (from the Saxon) the ſame with what we call a hundred, and more eſpecially

in the northern counties beyond the river Trent. There have been ſeveral conjectures as to the original of the word; one of which is, that anciently muſters were made of the armour and weapons of the inhabitants of every hundred; and from thoſe that could not find ſufficient pledges of their good abearing, their weapons were taken away, and given to others; whence it is ſaid this word is derived.

WAR, a conteſt or difference between princes, ſtates, or large bodies of people; which not being determined by the ordinary meaſures of equity and juſtice, is referred to the deciſion of the ſword.

Holy WAR, was that anciently maintained by leagues and croiſades, for the recovery of the Holy-land. See CROISADE.

WARD, in law-books, a word of divers ſignifications: thus, a ward in London, is a part of the city committed to the ſpecial charge of one of the aldermen of the city. There are twenty-ſix wards in London, which are as hundreds, and the pariſhes thereof as towns. A foreſt is alſo divided into wards, and ſo are moſt of our hoſpitals.

WARD, WARDA, or WARDAGIUM, is alſo uſed, in our ancient writings, for the cuſtody of a town or caſtle, which the tenants and inhabitants were bound to keep at their own charge.

WARD-HOOK, or WADD-HOOK, in gunnery, a rod or ſtaff with an iron end turned ſerpent-wiſe, or like a ſcrew, to draw the wadding out of a gun when it is to be unloaded.

WARDEN, or GUARDIAN, one who has the charge, or keeping of any perſon, or thing, by office. See the article GUARDIAN.

Such is the warden of the Fleet, the keeper of the Fleet-priſon; who has the charge of the priſoners there, eſpecially ſuch as are committed from the court of Chancery for contempt.

Warden, in an univerſity, is the head of a college, anſwering to what in other colleges we call maſter thereof.

Warden, or lord-warden of the cinque-ports, is a governor of theſe noted havens; who has the authority of an admiral, and ſends out writs in his own name.

Warden of the Mint, is an officer whoſe buſineſs it is to receive the gold and ſilver bullion brought in by the merchants, to pay them for it, and overſee the other officers. He is called keeper of the exchange and mint.

WARDMOTE, in London, is a court ſo called which is kept in every ward in the city, anſwering to the curiata comitia in antient Rome. See the article COURT.

WARDROBE, a cloſet or little room, adjoining to the bed-chamber, ſerving to diſpoſe and keep a perſon's apparel in; or for a ſervant to lodge in, to be at hand to wait, &c.

Wardrobe, in a prince's court, is an apartment wherein his robes, wearing apparel, and other neceſſaries, are preſerved under the care and direction of proper officers; as the maſter of the wardrobe, clerk, &c. of the wardrobe.

WARN, in law, is to ſummon a perſon to appear in a court of juſtice. See SUMMON.

WARNING-PIECE, in the military art, is the gun which is fired every night about ſun-ſet, to give notice to the drums and trumpets of the army to beat and ſound a retreat or tattoo, which is likewiſe called, ſetting the watch. See RETREAT.

WARNING-WHEEL, in a clock, is the third or fourth, according to its diſtance from the firſt wheel. See CLOCK.

WARP, in the manufactures, is the threads, whether of ſilk, wool, linen, hemp, &c. that are extended lengthwiſe on the weaver's loom; and acroſs which the workman, by means of his ſhuttle, paſſes the threads of the woof, to form a cloth, ribband, fuſtian, or other matter.

For a woollen ſtuff to have the neceſſary qualities, it is required that the threads of the warp be of the ſame kind of wool, and of the ſame fineneſs throughout; that they be ſized with Flanders or parchment ſize, well prepared, and that they be in ſufficient number with regard to the breadth of the ſtuff to be wrought.

To WARP *a Ship*, is to ſhift her from one place to another, when the wind and tide will permit it without danger.

WARRANT, an act, inſtrument, or obligation, whereby a perſon authoriſes another to do ſomething which he otherwiſe had not a right to do.

Warrant of attorney, is that whereby a man appoints another to do ſomething in his name, and warrants his action.

It ſeems to differ from a letter of attorney, which paſſes under hand and ſeal of him who makes it, before creditable witneſſes; whereas warrant of attorney, in perſonal, mixed, and ſome real actions, is put in of courſe by the attorneys for the plaintiffs or defendants.

WARRANTY, *Warrantia*, a promiſe or covenant by deed, made by the bargainer for himſelf and his heirs, to warrant and ſecure the bargainee and his heirs againſt all men for enjoying the thing agreed on between them.

WARRANTIA CHARTÆ, a writ that lies for a perſon who is infeoffed in lands and tenements, with clauſe of warranty, and is impleaded in an aſſize, or writ of entry, wherein he cannot vouch or call to warranty. See VOUCHER.

WARRANTIA DIEI, a writ which lies in caſe where a man, having a day aſſigned to appear perſonally in court to an action, wherein he is ſued, is, in the mean time, by commandment employed in the king's ſervice; ſo that he cannot come at the day aſſigned.

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It is directed to the juſtices, ordering them not to find or record him in default.

WARREN, *Warrena*, a franchiſe, or place privileged, either by preſcription or grant from the king, to keep beaſts and fowl of warren in; as rabbits, hares, partridges, pheaſants, &c.

By ſtatute 21 Edw. III. a warren may lie open, and there is no need of cloſing it in, as there is a park.

In the ſetting up a warren, great caution is to be uſed for the fixing upon a proper place, and a right ſituation. It ſhould always be upon a ſmall aſcent, and expoſed to the eaſt or the ſouth. The ſoil that is moſt ſuitable, is that which is ſandy; for when the ſoil is clayey or tough, the rabbits find greater difficulty in making their burrows, and never do it ſo well; and if the ſoil be boggy or mooriſh, there would be very little advantage from the warren, for wet is very deſtructive of theſe animals.

All due precautions muſt be taken, that the warren be ſo contrived, that the rabbits may habituate themſelves to it with eaſe. Many would have it, that warrens ſhould be encloſed with walls; but this is a very expenſive method, and ſeems not neceſſary nor adviſeable; for we find but very few that are ſo, and thoſe do not ſucceed at all the better for it.

WART, *Verruca*, in ſurgery, a little round hard excreſcence ariſing from the fleſh like a pea.

A wart begins at the cutis, and ſeems to be either an efflorescence of the ſerum of the blood, which hardening in the ſurface of the ſkin, makes a dry tumour; or elſe ſome ſmall luxuriancy of the little arteries of the cutis, which thruſt themſelves out, making a petty ſarcoma, which we call a ſoft wart. See the article SARCOMA.

According to the variety of the tumour, it is ſometimes whole with a ſmooth ſurface, and ſometimes chapped and uneven.

The method of cure which deſerves to be firſt mentioned, is by ligature or vincture; this is performed upon ſuch of theſe excreſcences as are ſlender about the roots, and in a manner pendent, by firmly tying about them a horſe-hair, or a ſilken or linen thread; the warts, being thus deprived of the juices which nouriſh them, through a conſtriction of the veſſels by the ligature, gradually wither and fall away.

Another method of cure, is the ſurgeon's inſtrument, with which the wart is taken up by a hook or forceps, and then very nicely ſeparated by the ſciſſars. The wound is treated for ſome time with an application of the lapis infernalis, or ſome other corroding medicine, that, if any part of a root ſhould remain, from which a new tubercle might ariſe, it might be conſumed and deſtroyed.

The cure by cauſtics is beſt performed by cutting off the hard upper part of the wart, with a razor or ſciſſars, and then ſurrounding its bottom with a circle of wax to prevent the ſpreading of the remedies; to touch it daily with oil of tartar, ſpirit of ſalt, aqua fortis, or butter of antimony. See CAUSTIC.

The cure by cautery is performed by chooſing a cautery of a proper ſize, and with that burning down to the root of the wart. This is the moſt painful of all the methods of extirpating theſe excreſcences, but the pain is but for a moment, and the warts extirpated this way never return. See CAUTERY.

The cure by evulſion, is performed by anointing them with ſoftening ointment, and then ſeizing them artfully between the thumb and fore-finger, and forcibly wrenching them out. This is a mountebank method, and a bad one; for it is not only very painful, but the warts commonly grow up again.

When warts are found to look livid and blue, it is beſt to let them alone entirely; becauſe, when irritated, they frequently degenerate into a cancer. See CANCER.

WART-WORT, *Tithymalus*, in botany. See TITHYMALUS.

WASH, among diſtillers, the fermentable liquor uſed by the malt-diſtillers. See DISTILLERY.

It ſhould be about the ſtrength of the ten ſhilling ſmall-beer; and if the ſpirit be expected fine, it had better be too thin than too thick. It is only made by mixing the water hot with the malt ground into meal. If the water be too hot, the mixture will become gluey; and if too cool, a part of the virtue of the malt will be loſt. Under the right application of the water is to be conſidered the proper manner of agitating the maſs, ſo that all the parts of the aqueous fluid may come fully and freely in contact with the ſoluble particles of the ſubject.

When once the water is well ſaturated by ſtanding on the malt a proper time, it muſt be drawn off, and freſh poured on, till at length the whole virtue, or all the ſugary ſweetneſs of the malt, is extracted, and nothing but a fixed huſky matter remains behind, incapable of being farther diſſolved by the action of hot or boiling water; or of being advantageouſly waſhed or rinced out by the bare affuſion of cold.

This artificial and external agitation or ſtirring about of the maſs, is neceſſary, not only in the common way of brewing for the malt-diſtillery, but alſo in that more expeditious way, now in uſe with ſome, of reducing the operations of brewing and fermenting to one, and grinding the malt to a fine meal, which is to be kept in the waſh during the whole time, and even put into the ſtill with it and worked together.

The ſtirring may be repeated to great advantage more than once in each operation, as at the affuſion of every parcel of freſh water, in the common way, and at any ſhortly diſtant times in the ſhort way, in which it is of greater ſervice.

The action of fermentation works ſuch a change

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in the body of the tincture or ſolution, called the waſh, as to render it ſeparable by diſtillation, into parcels of matter that are ſpecifically different, and of a nature entirely foreign to what the ſame liquor would have yielded without the fermentation. See FERMENTATION.

WASHING, in painting, is when a deſign, drawn with a pen or crayon, has ſome one colour laid over it with a pencil, as Indian-ink, biſtre, or the like, to make it appear the more natural, by adding the ſhadow of prominences, apertures, &c. and by imitating the particular matters, whereof the thing is ſuppoſed to conſiſt.

Thus they waſh with a pale red to imitate brick and tile; with a pale Indian-blue, to imitate water and ſlate; with green, for trees and meadows; with ſaffron or French-berries, for gold or braſs; and with ſeveral colours for marbles. Theſe waſhes are uſually given in equal teints or degrees throughout; which are afterwards brought down and ſoftened over the lights with fair water, and ſtrengthened with deeper colours for the ſhadows.

Some colours are of ſuch a gritty, ſandy nature, that it is impoſſible to grind them ſo fine as ſome curious works require; therefore, in order to get forth the flour and fineneſs of the colour, it muſt be waſhed, which is done thus: Take what quantity of colour you pleaſe to waſh, and put it into a veſſel of fair water; ſtir it about till the water be all coloured therewith, and if any filth ſwim on the the of the water, ſcum it clean off; and, when you think the groſſeſt of the colour is ſettled at the bottom, then pour off that water into another earthen veſſel, that is large enough to contain the firſt veſſel full of water four or five times; then pour more water into the firſt veſſel, and ſtir the colour that remains till the water be thick; and after it is a little ſettled, pour the water alſo into the ſecond veſſel, and fill the firſt veſſel again with water, ſtirring it as before; continue to do this till you find all the fineſt of the colour drawn forth, and none but coarſe gritty ſtuff remain in the bottom; then let this water in the ſecond veſſel ſtand to ſettle till it is perfectly clear, and that all the colour be ſunk to the bottom; which when you perceive, then pour the water clear from it, and reſerve the colour in the bottom for uſe, which muſt be perfectly dried before you mix it with oil to work.

The colours thus ordered, are red lead, blue and green bice, verditer, blue, green ſmalt, and Spaniſh brown, when you would cleanſe it well from ſtones for ſome fine work, as alſo yellow oker, when you intend to make gold ſize of it.

WASHING *of Ores*, the purifying an ore of any metal, by means of water, from earths and ſtones, which would otherwiſe render it difficult of fuſion; this operation Cramer orders to be done as follows. Break the ore to a coarſe powder in an iron mortar, weigh twenty or thirty docimaſtical centners of it, put them into the waſhing-trough, and pour ſome water upon them, that the ore may be thoroughly moiſt; then have a veſſel full of water, the diameter of which muſt be a little larger than the length of the trough; take the trough with the left hand, by the top of the hinder part, and dipping it horizontally into the water, move it gently with the right-hand from the fore-part of the trough, which is always to be made the ſhallower part of it, toward the hinder part, which is deeper; then take out the trough, and incline it a little on the fore-part, that the water may run out, and the heavier metallic part remain at the bottom; repeat this ſeveral times till the remains at the bottom of the trough are quite pure, if the ſtone in which the ore is lodged, be too hard for powdering in its natural ſtate, as the flinty and debaſed cryſtalline ones commonly are, the whole muſt be calcined, and quenched in cold water ſeveral times over, and afterwards powdered and waſhed in this manner: when it is thus waſhed, aſſay a centner of it, and from the bead of metal this yields, it will be eaſy to eſtimate the value of the ore.

WASHING, or WASHES, among goldſmiths, coiners, &c. are the lotions whereby they recover the particles of gold and ſilver out of the ſweep, i. e. aſhes, earths, ſweepings, &c

This is either performed by ſimply waſhing them again and again, or by putting them in the waſhing-mill

To make one of theſe waſhes, they not only gather together the aſhes of the furnaces, and ſweepings of the work-houſes, but they alſo break and pound the old earthen crucibles and the very bricks whereof the furnaces are built; little particles of gold, &c. being found to ſtick to them by the crackling natural to thoſe metals, when in their laſt degree of heat.

Theſe matters, being ground and mixed together, are put in large wooden baſons, where they are waſhed in ſeveral waters, which run off by inclination into troughs underneath; carrying with them the earth, and the inſenſible particles of the metals, and only leaving behind them the larger and more conſiderable ones which are viſible to the eye, and taken out by the hand without more trouble

To get out the finer parts gone off with the earth, they uſe quickſilver and a waſhing-mill. This mill conſiſts of a large wooden trough, at the bottom of which are two metalline parts, ſerving as mill-ſtones; the lower being convex, and the upper, which is in form of a croſs, concave

At top is a winch placed horizontally, which turns the upper piece round; and at bottom, a bung to let out the water and earth, when ſufficiently ground

To have a waſh, then, the trough is filled with common water, into which they caſt thirty or forty pounds

pounds of quickſilver, and two or three gallons of the matter remaining from the firſt lotion. Then turning the winch, they give motion to the upper mill-ſtone, which grinding the matter and the quick-ſilver violently together, the particles of gold and ſilver become the more eaſily amalgamated therewith. This work they continue for two hours, when, opening the bung, the water and earth run out, and a freſh quantity is put in.

The earths are eaſily thus paſſed through the mill three times, and the ſame quantity of mercury uſually ſerves all the three times. When there is nothing left in the mill but the mercury united with the gold or ſilver which it has amalgamated, they take it out, and waſhing it in divers waters, they put it in a ticken-bag, and lay it in a preſs to ſqueeze out the water, and the looſe quick-ſilver; the remaining quick-ſilver they evaporate by fire, in a retort, or an alembic. The metal which remains they refine with lead, or part it with aqua fortis. See ASSAYING.

WASP, in zoology, the black apis, with four yellow circles on the body. See the article APIS

WASP-FLY, the veſpæform aſilus, with the antennæ longer than the head. See the article ASILUS.

WAST, or WASTE, *Vaſtum*, in law, has divers ſignifications. It is uſed for a ſpoil, made either in houſes, woods, lands, &c, by the tenants for life, or for years, to the prejudice of the heir, or of him in reverſion or remainder

Upon this the writ of waſte is brought for the recovery of the thing waſted, and treble damages.

WASTE *of the Foreſt*, is properly where a man cuts down his own woods within the foreſt, without licence of the king or lord chief juſtice in eyre.

WASTE is alſo taken for thoſe lands which are not in any man's occupation, but lie common.

They ſeem to be ſo called, becauſe the lord cannot make ſuch profit of them, as of his other lands, by reaſon of the uſe others have thereof, for paſſing to and fro. Upon this none may build, cut down trees, &c. without the lord's licence.

WASTE *of a Ship*, is that part of her between the main and foremaſt

WASTE-BOARDS, are boards ſometimes ſet upon the ſide of aboat, or other veſſel, to keep the ſea from breaking into her.

WASTE-CLOTHS, in a ſhip of war, the ſame with fights. See the article FIGHT.

WATCH, in the art of war, a number of men poſted at any paſſage, or a company of the guards who go on the patrol. See the articles GUARD and PATROL.

Alſo a perſon poſted as a ſpy in any place, to have an eye thereto, and to give notice of what paſſes. A watch is properly intended for the apprehending of rogues in the night, as ward is for the like purpoſe in the day time; and for default to watch and ward, the townſhip, &c. is puniſhable. It is ordained, that in all towns between Michaelmas day and the day of Aſcenſion, there ſhall be night-watches kept in each city, with ſix men at every gate, and ſix or four in a town. Alſo every borough is to have twelve men to watch therein, or otherwiſe in proportion to the number of the inhabitants in the place, from ſun-ſet, to ſun-riſing, who are to arreſt ſtrangers ſuſpected, and diſturbers of the peace, &c. and may juſtify the detaining of them till the morning; or they may deliver them to the conſtable, in order to be carried before a juſtice.

At ſea, the term watch denotes a meaſure or ſpace of four hours, becauſe half the ſhip's company watch, and do duty in their turns, ſo long at a time; and they are termed ſtar-board watch, and lar-board watch.

WATCH is alſo uſed for a ſmall portable movement or machine for the meaſuring of time; having its motion regulated by a ſpiral ſpring. See the article SPRING.

Watches, ſtrictly taken, are all ſuch movements as ſhew the parts of time; as clocks are ſuch as publiſh it, by ſtriking on a bell, &c. But, commonly, the name watch is appropriated to ſuch as are carried in the pocket, and clock to the large movements, whether they ſtrike or not. See the article CLOCK.

The ſeveral members of the watch part are, 1. The ballance, conſiſting of the rim, which is its circular part; and the verge, which is its ſpindle, to which belong the two pallats or levers that play in the teeth of the crown-wheel. 2. The potence, or pottance, which is the ſtrong ſtud in pocket-watches, whereon the lower pivot of the verge plays, and in the middle of which one pivot of the ballance-wheel plays; the bottom of the potence is called the foot, the middle part the noſe, and the upper part the ſhoulder. 3. The cock, which is the piece covering the ballance. 4. The regulator or pendulum ſpring, which is the ſmall ſpring in new pocket-watches, underneath the ballance. 5. The pendulum, whoſe parts are the verge, pallets, cocks, and the bob. 6. The wheels, which are the crown-wheel in pocket pieces, and the ſwing-wheel in pendulums, ſerving to drive the ballance or pendulum. 7. The contrate-wheel, which is that next the crown wheel, &c. and whoſe teeth and hoop lie contrary to thoſe of other wheels; whence the name. 8. The great or firſt wheel, which is that the fuſee, &c. immediately drives: after which are the ſecond wheel, third wheel, &c. 9. Laſtly, between the frame and dial-plate, is the pinion of report, which is that fixed on the arbor of the great wheel, and ſerves to drive the dial-wheel, as that ſerves to carry the hand.

Spring, or *Pendulum* WATCHES, are pretty much upon the ſame principle with pendulum clocks, whence their denomination.

If a pendulum deſcribing little arches of a circle make vibrations of unequal lengths, in equal times, it is by reaſon it deſcribes the greater with greater velocity. For the ſame reaſon a ſpring put in motion, and making greater or leſs vibrations, as it is more or leſs ſtiff, and as it has a greater or leſs degree of motion given it, performs them nearly in equal times. Hence, as the vibrations of the pendulum had been applied to large clocks to rectify the inequality of their motions; ſo, to correct the unequal motions of the ballance of watches, a ſpring is added, by the iſochroniſm of whoſe vibrations the correction is to be effected.

The ſpring is uſually wound into a ſpiral, that, in the little compaſs allotted it, it may be as long as poſſible, and may have ſtrength enough not to be maſtered and dragged about by the inequalities of the ballance it is to regulate.

The vibrations of the two parts, viz. the ſpring and ballance, ſhould be of ſome length; only ſo adjuſted, as that the ſpring, being more regular in the length of its vibrations than the ballance, may on occaſion communicate its regularity thereto

The invention of ſpring or pocket watches, is owing to the artiſts of the preſent age. It is true, we find mention made of a watch preſented to Charles V. in the hiſtory of that prince; but this in all probability was no more than a kind of a clock to be ſet on a table, ſome reſemblance whereof we have ſtill remaining in the ancient pieces made before the year 1670.

In effect, it is between Dr. Hooke and Mr. Huygens, that the glory of this excellent invention lies, but to which of them it properly belongs, is greatly diſputed; the Engliſh aſcribe it to the former, and the French, Dutch, &c. to the latter. Mr. Derham, in his Artificial Clock-maker, ſays plainly that Dr. Hooke was the inventor; and adds, that he contrived various ways of regulation. One was with a load-ſtone: another with a tender ſtraight ſpring, one end whereof played backwards and forwards, with the ballance; ſo that the ballance was to the ſpring, as the bob to a pendulum; and the ſpring, as the rod thereof. A third method was with two ballances, of which there were divers ſorts, ſome having a ſpiral ſpring to the ballance for a regulator, and others without. But the way that prevailed, and continues in mode, was with one ballance and one ſpring running round the upper part of the verge thereof. Though this has a diſadvantage which thoſe of two ſprings, &c. were free from, in that a ſudden jerk or confuſed ſhake will alter its vibrations, and put it in an unuſual hurry.

The time of theſe inventions was about the year 1658, as appears, among other evidences, from an inſcription on one of the double-ballance watches preſented to king Charles II. viz. Robert Hooke invent. 1658, T. Tompion fecit, 16. The invention preſently got into reputation, both at home and abroad; and two of them were ſent for by the dauphin of France.

Soon after this, Mr. Huygens's watch, with a ſpiral ſpring, got abroad, and made as great noiſe in England, as if the longitude could be found out by it. It is certain, however, that his invention was later than the year 1673, when his book de Horol. Oſcillat. was publiſhed, wherein he has not one word of this, though he has of ſeveral other contrivances in the ſame way.

Aſtronomical WATCH, a machine invented by Mr. Neale, for ſolving ſeveral aſtronomical problems. It has two glaſſes; that in the front covers a dial-plate, as in common watches; the other on the back-ſide, covers a plate forming a ſegment of a globe, on which are drawn twenty-four meridian lines, with the names of ſo many countries, at 15° difference of longitude from each other. (See plate XCIII. fig. 1.) This plate makes an entire revolution in twenty-four hours; and, conſequently, every country thereon paſſes by the ſun, repreſented by A. Round this plate is a circle divided into twenty-four hours, alſo at reſt; by means of which, when the moveable plate is made to correſpond with the true time, ſhewn by the hands on the common ſide, the time of day or night, at the ſeveral countries ſpecified, is ſhewn by the hour-circle. Round the moveable plate, and between it and the circle of hours above deſcribed, moves a narrow circle, on which is engraved the moon's age; and over $29\frac{1}{2}$ is placed an ivory ball, B, repreſenting the moon: and at right angles each way, are placed two pins, C, and D, one eaſtward, and the other weſtward; by means of which, the time of the moon's riſing, ſouthing, and ſetting, at thoſe different places, is ſhewn in a very entertaining manner. Several other uſeful aſtronomical problems may alſo be ſolved thereby.

Striking WATCH, one which, beſides the common watch-work for meaſuring time, has a clock-part for ſtriking the hours; ſo that, properly ſpeaking, they are pocket-clocks. See CLOCK.

Repeating WATCH, one that by only pulling a ſtring, puſhing in a pin, &c. repeats the hour, quarter, or minute, at any time of the day or night.

WATCHING, or WAKEFULNESS, *Inſomnia*, in medicine, is produced by two great a determination of the nervous fluid, to the organs of the ſenſes; whereby theſe organs are prepared to receive, readily, any impreſſion from external objects, which they propagate to the brain, and furniſh the ſoul with divers occaſions of thinking. This extraordinary flux of ſpirits may have two cauſes; for, 1. The ſenſible objects may ſtrike the organ with too much force. In which caſe, the animal ſpirits being

ing violently agitated, and thoſe agitations continued by the nerves to the brain, they give a like motion to the brain itſelf; the neceſſary conſequence of which is, that the animal muſt wake. Thus, a loud ſhriek, pains, head-ach, gripes, coughing, &c. cauſe waking. And the ſoul's being oppreſſed with cares, or deeply engaged in thinking, contributes to the ſame, ſince, as it acts by the miniſtry of the ſpirits, any cares or meditations that keep them in motion, muſt produce watchfulneſs. Of this kind are thoſe inveterate wakings of melancholic perſons, ſome of whom have been known to paſs three or four weeks without a wink of ſleep. See the article SLEEP.

2. The other cauſe is in the ſpirits themſelves, which have ſome extraordinary diſpoſition to receive motion, or to perſiſt in it; as from their too great heat, or that of the brain, in fevers, &c. Hence it is that it is moſt frequent in ſummer, in the heat of youth.

Long faſting has the ſame effect; the want of food ſubtilizing the ſpirits, and drying the brain. The ſame is likewiſe an ordinary ſymptom in old age, by reaſon the pores of the brain and nerves, having been much widened by the continual paſſage of ſpirits, for a great number of years, the ſpirits now paſs and repaſs through them with too much eaſe, and need not any extraordinary motion to keep the mind awake.

There are inſtances of waking forty-five nights ſucceſſively; and we even read of a melancholy perſon, who never ſlept once in fourteen months. Such watchings uſually degenerate into madneſs.

When the cauſe is known, it muſt be removed, if poſſible, and the irritated ſpirits muſt be appeaſed with emulſions, eſpecially of poppy-ſeeds, or with the thebaic tincture, or theriaca, and other opiates in general, not neglecting the original diſeaſes. In fevers, a moiſt ſoftening diet is beneficial; as alſo preparations of barley, emulſions of poppy-ſeeds and almonds, decoctions of ſcorzonera-roots, almond cream, and winter ſlummery uſed as an aliment: likewiſe tea made of cowſlip-flowers, and gentle laxatives. When the patient is reſtleſs and wakeful the night before a criſis, no hypnotics ſhould be given.

When there is no other diſeaſe, the patient ſhould ſhun all care, and intenſe thinking, eſpecially in the evening: he ſhould alſo uſe exerciſe, and eat light ſuppers. If it is cauſed by pains, they ſhould be appeaſed by antiſpaſmodics, things which temperate, and diaphoretics; and if theſe will not do, mild opiates muſt be added.

In old perſons, all care and ſolitude muſt be baniſhed; the mind ſhould be quiet, and the moderate uſe of generous wine may be allowed in the evening; likewiſe medicines of amber and muſk will be proper, and confectio alkermes, or theriaca with wine. The drinking of hot water, and principally coffee, muſt be forbid after dinner. See the article FEVER.

WATER, *Aqua*, in phyſiology, a ſimple, fluid, and liquid body, reputed the third of the four vulgar elements. Sir Iſaac Newton defines water to be a fluid ſalt, volatile and void of taſte: but this definition Boerhaave ſets aſide, in as much as water is a menſtruum or diſſolvent of ſalts and ſaline bodies, which does not agree with the notion of its being a ſalt itſelf; for we do not know of any ſalt that diſſolves another. This laſt-mentioned philoſopher, therefore, defines water, a very fluid, ſcentleſs, taſteleſs, tranſparent, colourleſs liquor, which turns to ice with a certain degree of cold.

Though water be defined a fluid, it is a point controverted among philoſophers, whether fluidity be its natural ſtate, or the effect of violence. We ſometimes find it appear in a fluid, and ſometimes in a ſolid form; and as the former, in our warmer climate, is the more uſual, we conclude it the proper one, and aſcribe the other to the extraneous action of cold.

Boerhaave, however, aſſerts the contrary, and maintains water to be naturally of the cryſtalline kind; ſince, wherever a certain degree of fire is wanting to keep it in fuſion, it readily grows into a hard glebe, under the denomination of ice. Mr. Boyle is of the ſame opinion. Ice, he obſerves, is uſually ſaid to be water brought into a preternatural ſtate by cold; but with regard to the nature of things, and ſetting aſide our arbitrary ideas, it might as juſtly be ſaid, that water is ice preternaturally thawed by heat.

If it be urged, that ice, left to itſelf, will, upon the removal of the freezing agents, return to water; it may be anſwered, that (not to mention the ſnow and ice which lie all ſummer on the Alps, and other high mountains, even in the torrid zone) we have been aſſured, that in ſome parts of Siberia, the ſurface of the ground continues more months in the year frozen by the natural temperature of the climate, than thawed by the heat of the ſun; and a little below the ſurface of the ground, the water which chances to be lodged in the cavities there, continues in a ſtate of ice all the year round; ſo that when, in the heat of the ſummer, the fields are covered with corn, if you dig a foot or two deep, you ſhall find ice and a frozen ſoil.

Water is generally divided into ſalt and freſh, with regard to the ocean and rivers. But, according to Dr. Shaw, it ſeems diviſible into as many different ſpecies, as the earth is into beds. Thus there are mineral waters of various kinds, according to the mineral ſubſtance they run over, and become impregnated with; though this impregnation ſometimes happens in the way of vapour and exhalation. Water, therefore, in the general, may be as mixed a body as earth, and perhaps neither of them naturally exiſts in any conſiderable purity.

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In a general analyſis of water, the doctor found, 1. That common warm water throws up numerous little bubbles, and explodes, in the exhauſted receiver of the air-pump; for which reaſon, water contains what may, by way of diſtinction, be called æther or ſpirit.

2. It contains a merely aqueous part, diſtinct from æther and the ſediment, as appears from diſtilled common water.

3. It contains a dry ſolid matter, which is either earthy or ſaline, as appears upon a full evaporation, and from the inſides of tea-kettles, which, after long uſe, are lined with a ſtony matter, that beats off in flakes or cruſty pieces.

Water is not only contained in the earth as in a reſervoir, but likewiſe floats in the atmoſphere. In both caſes, it is actuated, rarified, and put in motion by heat, ſo as to prove inſtrumental in producing effects. Thus it produces clouds, rains, dews, ſprings, and rivers. It refreſhes the earth, recruits vegetables, and is the ſupport of fiſh and other animals by conveying nutriment to all their parts. It is alſo the firſt and immediate inſtrument of fermentation, putrefaction, corruption, and change in all vegetable and animal ſubjects.

But the nature and uſes of water, will beſt appear from the following experiments:

1. That water is contained in many ſolid bodies, and to appearance in dry bodies, was proved thus: a piece of the hardeſt and drieſt bone being procured, and diſtilled in an earthen retort, with degrees of fire, a very large proportion of water, along with much oil and volatile ſalt, was obtained: whence it appears, that animal matters are reſolvable into the four chemical principles, water, oil, ſalt, and earth. This experiment holds true even of the oldeſt hartſhorn, the drieſt and hardeſt woods, earths, and pulverized ſtones.

Whence it alſo appears, that water may be concealed in ſolid bodies, and make a conſtituent part thereof: for it is not meant that water inſinuates itſelf into the ſuperficial pores of bodies, ſuch as wood, ſkins, &c. ſo as to ſwell them in moiſt weather, and leave them ſhrunk in dry; but that it remains permanently intermixed as an eſſential ingredient, or as a part of ſolid bodies. See BODY.

2. That water may be collected from the drieſt air, or in the hotteſt climate, was proved by the following experiment:

Half a pint of common water was put into a cylindrical glaſs, wiped perfectly dry on the outſide; then was added to the water, two ounces and three quarters of pulverized and dry ſal ammoniac; theſe were ſtirred briſkly together, whereupon the water floating in the external air, was, by the coldneſs thus produced, condenſed on the outſide of the glaſs as the ſalt diſſolved within, and trickled down in ſmall veins, into the ſhallow baſon ſet underneath to receive it.

This experiment holds in all climates and places of different heights where it has been tried; whence, by the law of induction, we may make it univerſal, till any contradictory inſtance appears. Thus, therefore, it may hold in the moſt parched countries and hotteſt ſeaſons, ſo as to afford an agreeable method of cooling potable liquors, and render them more refreſhing. For if the containing glaſs of the ſalt and water be ſet in any liquor, the liquor will be cooled thereby; and if any conſiderable improvement could be made in the contrivance, it is obſerved, that it might, in ſome meaſure, ſerve to ſupply the thirſty traveller in parched deſarts, and the ſailors with freſh water at ſea.

3. To determine the proportion of water contained in an aſſigned portion of the atmoſphere, we are directed by the following experiment:

Having by means of the air-pump, and an exact pair of ſcales, found the weight of a certain quantity of air, contained in a large glaſs veſſel, there was included therein a certain known weight of well-dried potential cautery, whoſe property it is powerfully to attract the moiſture of the air. This veſſel was kept cloſe ſtopped for ſeveral hours; during which time, the potential cautery was grown wet, in which ſtate being weighed again, it was found conſiderably to increaſe; which muſt be either owing to the water attracted out of the air in the glaſs, or to a condenſation of the air itſelf into an aqueous fluid; for ſuch a fluid might now by diſtillation be obtained from the matter thus run per deliquium.

It is obſerved that there is room to ſuſpect, that if this experiment were made in perfection, a weight of water almoſt equal to that of the air included in the veſſel, might be thus obtained, which might prove an extraordinary diſcovery, and ſhew what ſome have endeavoured to prove, that the matter of common air is little more than water.

4. That an earthy ſubſtance is naturally contained in water, was proved as follows. Three ſeveral glaſſes were filled with pure rain-water, ſpring-water, and Thames-water, and ſuffered to ſtand, cloſe covered, for ſome days before they were exhibited. There was an earthy ſediment then depoſited in all the three, but moſt in the Thames-water, the ſediment whereof was not only larger, but alſo more foul and muddy than in the rain-water; though here, alſo, it was dirty, perhaps, becauſe not carefully collected; whereas, in the pump-water, it was white, ſcaly, flaky, and ſhining, like fine ſpangles of talc. This experiment is alſo univerſal, ſo far as it has been tried with care, and holds true of the waters of all ſpecies and all countries, particularly in thoſe called mineral waters, from which an earthy ſubſtance may uſually be precipitated by art, in a conſiderable proportion.

Certain experiments carefully made, and repeated, ſhew that the terreſtrial matter naturally contained in water, has a principal ſhare in the growth and increaſe

creaſe of vegetables; all the plants that thrive in water appearing to enlarge their bulk in proportion to the earthy matter they draw from the water. Whence pure elementary water, ſeems but a kind of vehicle to convey this nutrimental or ſubſtantial part, and depoſite it in the veſſels thro' which the water moves, in order to its general exit at the ſurface of vegetables. But we are not here to exclude the inſtrumental efficacy of the two other elements, fire and air. And this appearing to be the general office of water, in the whole animal and vegetable kingdoms, viz. the conveyance or diſtribution of the alimentary matter to all their parts, it may be proper to conſider its phyſical properties, which would wonderfully fit it for this office.

The figure of its component parts appears to be ſmooth and ſpherical, like thoſe of quickſilver; whence it becomes extremely moving and penetrating. Thus it readily enters the pores of wood, leathers, ſkins, chords, muſical ſtrings, &c. thus likewiſe it becomes capable of moving and agitating particles of matter leſs active than itſelf, and ſo proves the more immediate phyſical agent of fermentation, putrefaction, ſolution, &c. and thus it alſo conveys earthy and ſaline matters through our filtres of paper, ſtone, &c. and even raiſes ſome proportion of them in diſtillations. Its particles likewiſe appear to be extremely minute, and ſo have a large ſhare of ſurface.

Hence water is admirably fitted for a ſolvent, or for readily entering the pores of ſalts, and coming into full contact with all their particles; and thus it will paſs where air cannot, on account of its moiſture, or lubricating power, whereby it faſtens mucilaginous matters, and will therefore ſoak through the cloſe pores of a bladder.

The ſpecific gravity of water, and conſequently its goodneſs by its lightneſs, are to be directly judged of by the hydroſtatical balance. This experiment is a good ſubſtitute for ſeveral other ways of examining the purity and goodneſs of waters, both common and mineral; for it appears by numerous inſtances, that light waters are, *cæteris paribus*, the beſt, pureſt, and wholeſomeſt That water is accounted beſt and wholeſomeſt, which is not only the lighteſt and freeſt from earthy ſediment, but that which is moſt ſpiritous; and theſe properties are uſually found in pure rain-water; that being naturally diſtilled from the ocean and rivers, or by the heat of the ſun raiſed up into the atmoſphere, from whence it is returned much after the manner of common diſtillation.

From the preceding, and other experiments of Dr. Shaw, made upon water, he deduces the following axioms:

Firſt, we have ſeen, That water is naturally contained in ſome of the drieſt and hardeſt bodies, and in the drieſt air. 2. That itſelf naturally contains an earthy ſubſtance. 3. That it is the proper menſtruums of ſalts, diſſolving more of one, and leſs of another. 4. That one good ſign of its purity and wholeſomeneſs is levity. 5. That the ingredients of a mineral water may be diſcovered by chemical expedients: and, 6. That mineral-waters are imitable by art from ſuch diſcovery.

Secondly, That water is of infinite uſe in all the works both of nature and art, as without it there could be no generation, nutrition, or accretion, performed in any of the animal, vegetable, mineral, marine, or atmoſpherical regions. The blood could not flow in the veins, the ſap in the veſſels of vegetables, nor the particles of minerals concrete and grow together, without water. It is this that makes the largeſt part of our blood, our drink, and other aliments. There could be no corruption, fermentation, or diſſolution, carried on without it; no brewing, no diſtilling, no wines, no vinegar, no ſpirits, made without it.

Thirdly, That we meet with water under an infinine variety of forms, and in an infinite variety of bodies, as that of air, vapour, clouds, ſnow, hail, ice, ſap, wines, blood, fleſh, bone, horn, ſtone, &c. through all which it ſeems to paſs unaltered, as an agent or inſtrument that ſuffers no alteration by re-action, but remains capable of reſuming the form of water again upon occaſion.

Fourthly, That water, in its own common ſtate, appears to be a combination of all the elements together, as containing a quantity of fire, which keeps it fluid; a quantity of air, and a quantity of earth: whence it can be no wonder that water alone, as it appears to the ſenſes, ſhould ſuffice for vegetation in ſome caſes, where little earth is wanted, or for ſupporting animal and mineral life, where no great degree of nutriment is required; and hence it proves a gluten, or cement, to ſome bodies, and a ſolvent to others; thus it conſolidates brick, plaſter of Paris, ſtone, bone, &c. but diſſolves ſalts, and ſubtile earths approaching to ſalts, and becomes the inſtrumental cauſe of their action.

Fifthly, That water conveys nouriſhment, or a more fixed and ſolid matter to the parts of vegetables, where having depoſited it, the finer fluid perſpires into the atmoſphere, which gives us the phyſical cauſe of the dampneſs and unwholeſomeneſs of woody countries, as they remarkably find in America. For all large vegetables act after the manner of forcing-pumps, and continually draw in large quantities of water at their roots, and diſcharge it at their leaves, which intimates a method of collecting water in dry countries, and likewiſe of making ſalt-water freſh.

Sixthly, That the water in paſſing through plants, after having depoſited its more terreſtrial part, does not always go off pure, but impregnated with the finer effluvia, or more ſubtile particles of the vegetable; thus, making an atmoſphere round every plant, according to its nature odoriferous or otherwiſe,

which ſupplies us with a rule for procuring the odoriferous waters of vegetables by diſtillation.

Seventhly, That the particles, not fine enough to go off thus along with the water, are left behind upon the ſurface of the leaves and flowers of plants, being now thickened or ſtrained from their moiſter parts, and remaining in the form of honey, manna, gums, balſams, &c. according to the nature of the vegetable. And hence appears the phyſical cauſe of plants proving more odoriferous and ſweet when the weather is both warm and moiſt, as immediately after a ſummer's ſhower.

Eighthly, That the chemical operator ſhould form to himſelf an hygrometer, for the ſervice of his elaboratory, to determine the proportion of water at all times contained in the air, which continually mixes with his preparations, differently augments their weight, and promotes or hinders many of his operations.

Ninthly, That pure water makes the largeſt part of mineral-waters, where it is impregnated as a menſtruum, with ſeveral ingredients that it diſſolves or drinks up in its paſſage through the earth.

Tenthly, and laſtly, The preceding enquiry affords conſiderable light for diſcovering practicable ways of making ſea-water freſh and potable, and of preparing waters by art, ſo as to render them fitter for the common œconomical uſes, and the ſervice of many particular arts, as medicine, pharmacy, chemiſtry, brewing, diſtilling, &c.

Water is of the utmoſt uſe in divers of the mechanical arts and occaſions of life, as in the motion of mills, engines, fountains, and other machines; the conſtruction of all which, ſubſervient thereto, or founded thereon, as ſiphons, pumps, &c. make the ſubject of hydraulics.

The laws, properties, &c. of this fluid, with reſpect to the fore-ſaid uſes, as its motion, gravitation, preſſion, elevation, action, momenta, and velocities, &c. which make the ſubject of hydroſtatics, may be ſeen under the articles FLUID and HYDROSTATICS.

WATER, in hydrography and geography, is a common or general name applied to all liquid tranſparent bodies, gliding or flowing on the earth; in which ſenſe, water and earth are ſaid to conſtitute our terraqueous globe.

For the periodical changes, to which the water of the ſea is liable, ſee the articles EBB, FLUX, and TIDES.

WATERS, in medicine, pharmacy, &c. called alſo artificial and medicated waters, are a kind of liquors procured or prepared by art from divers bodies, principally of the vegetable tribe, having various properties, and ſerving for various properties.

Theſe waters are either ſimple, or compound: Simple-waters are thoſe procured from ſome one vegetable body, the intention of which is to draw out the virtues of the herb, ſeed, flower, root, or the like, ſo as it may be more conveniently given in that form than any other. The means whereby this ſeparation is effected, are either evaporation, infuſion, decoction, or diſtillation.

Compound-waters, or thoſe wherein ſeveral ingredients are uſed, are very numerous, and make a large article in commerce; ſome prepared by the apothecaries, according to the diſpenſatory preſcripts, for medicinal uſes; others by the diſtillers, to be drank by way of dram; and others by the perfumers, &c. They are diſtinguiſhed by different epithets, in reſpect either of the ſpecific virtues of the water, or the parts of the body for the cure whereof they are intended, or the diſeaſes they are good againſt, or the ingredients they are compounded of, or their different uſes, &c.

As theſe waters are exceeding numerous, and the manner of making them is not always the ſame, we muſt refer the chemical or medical reader to the diſpenſatories, wherein he will find, that every one gives his own method as the beſt one.

We have only three general remarks to add, with regard to thoſe intended for drinking, viz.

1. That ſuch wherein any thing is infuſed, as bruiſed fruits, pounded herbs, &c. or ground ſpices, muſt be always paſſed through a filtre, to make them finer and purer.

2. That thoſe made with brandy, or ſpirit of wine, are uſually diſtilled after mixing their ingredients, which renders thoſe liquors exceeding ſtrong and dangerous.

3. That the waters which take their names from particular things, as cinnamon, &c. have often ſome other ingredients joined with them, according to the taſte or ſmell required.

WATER, in anatomy, is applied to divers liquors or humours in the human body; ſuch is the aqua phlegmatica, which is a ſoft ſerous humour, contained in the pericardium, and wherein the heart ſwims.

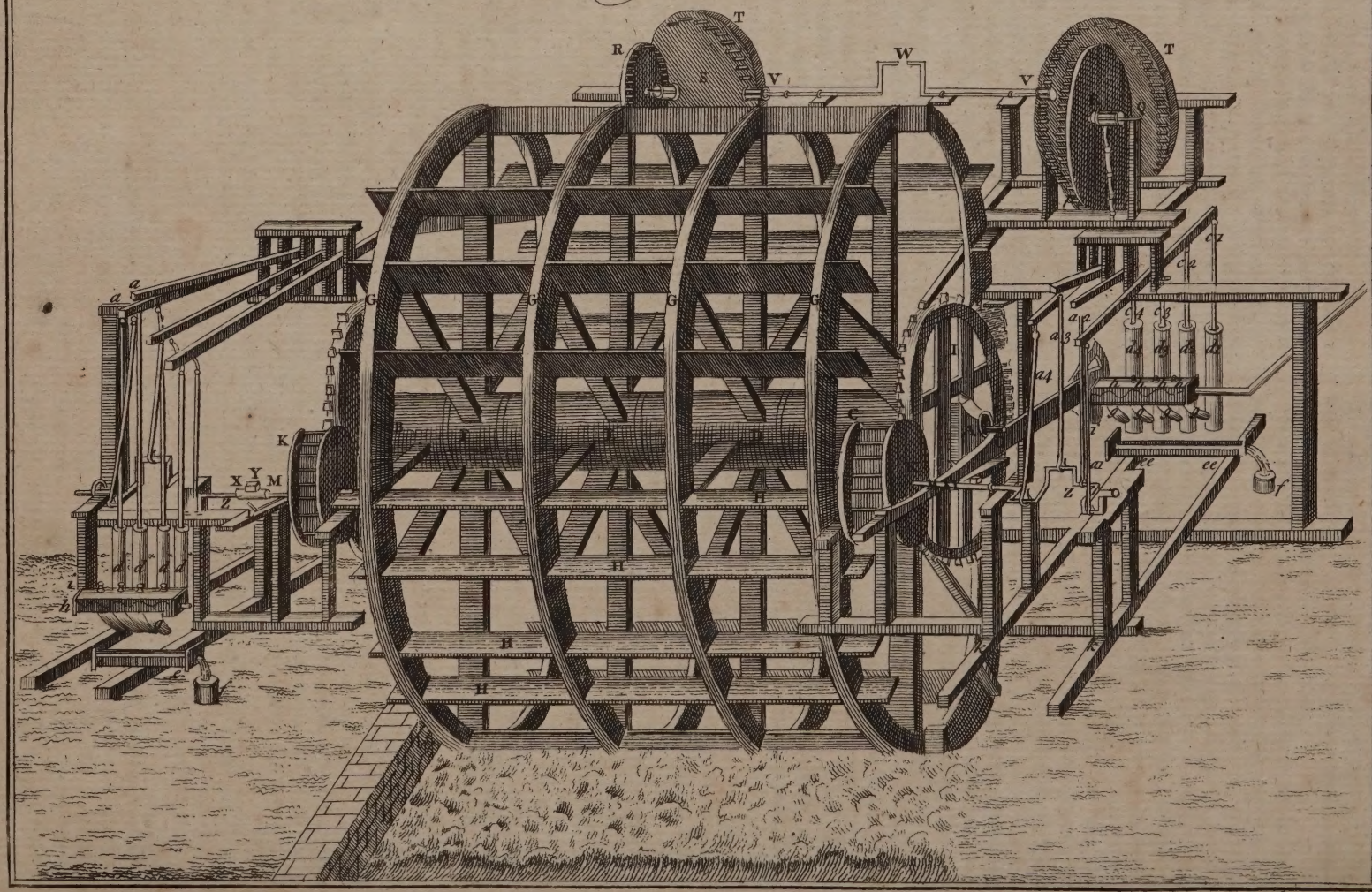
Holy-WATER, a water prepared every Sunday, in the Romiſh church, with divers prayers, exorciſms, &c. uſed by the people to croſs themſelves withal, at their entrance to and going out of church; and pretended to have the virtue of waſhing away venial ſins, driving away devils, preſerving from thunder, diſſolving charms, ſecuring from or curing diſeaſes, &c.

Many of the reformed take the uſe of holy-water to have been borrowed from the luſtral-water of the ancient Romans. See the articles LUSTRATION, &c.

WATER-ORDEAL, or *Trial*, among our anceſtors, was of two kinds, by hot and by cold, water.

Trial, or purgation, by boiling or hot water, was a way of proving crimes, by immerging the body, or arm, in hot water, with divers religious ceremonies. In the judgment by boiling water, the accuſed, or he who perſonated the accuſed, was obliged

London Bridge Water Works.



T. Lodge sculp.

obliged to put his naked arm into a caldron full of boiling water, and to draw out a ſtone thence placed at a greater or leſs depth, according to the quality of the crime. This done, the arm was wrapped up, and the judge ſet his ſeal on the cloth, and at the end of three days they returned to view it, when if it was found without any ſcald, the accuſed was declared innocent.

The nobles, or great perſonages, purged themſelves thus, by hot-water, and the populace by cold water.

The trial, or purgation by cold water, was thus: after certain prayers and other ceremonies, the accuſed was ſwaddled, or tied up, all in a pelotoon or lump, and thus caſt into a river, lake, or veſſel, of cold water, where if he ſunk he was held criminal, if he floated innocent.

In the levitical law, we find mention made of water which ſerved to prove, whether or no a woman was an adultereſs; the formula, as it was performed by the prieſt, may be ſeen in the fifth chapter of the book of Numbers.

WATER, among jewellers, is properly the colour or luſtre of diamonds and pearls. The term, though leſs properly, is ſometimes uſed for the hue or colour of other ſtones.

WATER-MEASURE. Salt, ſea-coal, &c. while aboard veſſels in the pool or river, are meaſured with the corn-buſhel heaped up; or elſe five ſtricked pecks are allowed to the buſhel. This is called water-meaſure. See the article MEASURE.

WATER-MEN, are ſuch as row in boats, or ply on the river Thames, in the government of whom the lord-mayor of London, and court of aldermen there, had always great power. They ſtill have the appointing of their fares, the taking more than which, makes them liable to a fine of forty ſhillings and half a year's impriſonment. The fares aſſeſſed are, from London-bridge to Limehouſe, Ratcliff-croſs, &c. oars, 1s. ſcullers, 6d. to Wapping-dock, Rotherhithe-church-ſtairs, &c. oars, 6d. ſcullers, 3d. from either ſide of the water above the bridge to Lambeth and Vauxhall, oars, 1s. ſcullers, 6d. all the ſtairs between London-bridge and Weſtminſter, oars, 6d. ſcullers, 3d.

Watermens boats ought to be twelve feet and a half in length, and four and a half in breadth; and no apprentice to any waterman ſhall take upon him the care of a boat till he is ſixteen years of age, if a waterman's ſon; and ſeventeen, if a landman's ſon, unleſs he has worked with ſome able waterman two years, &c.

No tilt-boat, or row-barge, &c. may take in above thirty-ſeven paſſengers, or three more by the way; nor any boat above eight paſſengers, and two by the way, elſe they forfeit 5l. for the firſt offence, and 10l. for the ſecond, &c. and if any perſon be drowned when a greater number are taken in, the waterman is declared guilty of felony, and may be tranſported, &c.

WATER-SHOOT, a young ſprig which ſprings out of the root or ſtock of a tree.

WATER-TABLE, in architecture, a ſort of ledge left in ſtone, or brick-walls, about eighteen or twenty inches from the ground, from which place the thickneſs of the wall begins to abate.

WATER-WAY, in a ſhip, is a ſmall ledge of timber, lying fore and aft on the deck, cloſe by her ſides, to keep the water from running down there.

WATER-WHEEL, an engine for raiſing water in great quantity out of a deep well.

WATER-WORKS, in general, denote all manner of machines moved by, or employed in raiſing or ſuſtaining water; in which ſenſe, water-mills of all kinds, ſluices, aqueducts, &c. may be called water-works,

The term water-works, however, is more particularly uſed for ſuch machines as are employed only in raiſing water.

We ſhall begin with the deſcription of that at London-bridge, which is moved by the common tide-waterof the river Thames. A B (plate XCIV.) the axle-tree of the water-wheel, is nineteen feet long, three feet diameter, in which C, D, E, F, are four ſets of arms, eight in each place, on which are fixed G, G, G, G, four rings, or ſets of fellows, in diameter twenty feet; and the floats H, H, H, fourteen feet long, and eighteen inches deep, being about twenty-ſix in number.

The wheel lies with its two gudgeons, or center-pins A B, upon two braſſes in the pieces M N, which are two great levers, whoſe fulcrum, or prop, is an arched piece of timber L: the levers being made circular on their lower ſides to an arch of the radius M O, and kept in their places by two arching ſtuds fixed in the ſtock L, through two mortiſes in the lever M N. The wheel is, by theſe levers, made to riſe and fall with the tide, which is performed in this manner: the levers M N are ſixteen feet long; from M, the fulcrum of the lever, to O the gudgeon of the water-wheel, ſix feet; and from O to the arch at N, ten feet. To the bottom of the arch N is fixed a ſtrong triple chain P, made after the faſhion of a watch-chain, but the links arched to a circle of one foot diameter, having notches, or teeth, to take hold of the leaves of a pinion of caſt iron Q, ten inches diameter, with eight teeth in it moving on an axis. The other looſe end of this chain has a large weight hanging at it, to help to counterpoiſe the wheel, and preſerve the chain from ſliding on the pinion. On the ſame axis is fixed a cog-wheel R, ſix feet diameter, with forty-eight cogs. To this is applied a trundle, or pinion S, of ſix rounds, or teeth; and upon the ſame axis is fixed T, a cog-wheel of fifty-one cogs, into which the trundle V, of ſix rounds, works;

on

on whoſe axis is a winch or windlaſs W, by which one man, with the two windlaſſes, raiſes or lets down the wheel, as there is occaſion. And becauſe the fulcrums of theſe levers M N are in the axis of the trundle K, viz. at M or X, in what ſituation ſoever the wheel is raiſed or let down, the cog-wheel I, I, is always equidiſtant from M, and works or geers truly.

By means of this machine, the ſtrength of an ordinary man will raiſe about fifty ton weight.

I, I, is a cog-wheel fixed near the end of the great axis, eight feet diameter, and forty-four cogs working into a trundle K, of $4\frac{1}{4}$ feet diameter, and twenty rounds, whoſe axis or ſpindle is of caſt iron four inches in diameter, lying in braſſes at each end, as at X.

Z Z is a quadruple crank of caſt iron, the metal being ſix inches ſquare, each of the necks being turned one foot from the center, which is fixed in braſſes at each end in two head-ſtocks faſtened down by caps. One end of this crank at Y is placed cloſe abutting to the end of the axle-tree X, where they are at thoſe ends ſix inches diameter, each having a ſlit in the ends, where an iron wedge is put, one half into the end X, the other half into Y, by means of which the axis X turns about the crank Z Z.

The four necks of the crank have each an iron ſpear, or rod, fixed at their upper ends to the reſpective libra, or lever, *a* 1, 2, 3, 4, within three feet of the end; theſe levers are twenty-four feet long, moving on centers in the frame *b b b b*; at the end of which, at *c* 1, 2, 3, 4, are jointed four rods with their forcing plugs working into *d* 1, 2, 3, 4, four caſt iron cylinders four feet three quarters long, ſeven inches bore above, and nine below where the valves lie, faſtened by ſcrewed flanches over the four holes of a hollow trunk of caſt iron, having four valves in it juſt over *e e e e*, at the joining on at the bottom of the barrels, or cylinders, and at one end a ſucking-pipe or grate *f*, going into the water, which ſupplies all the four cylinders alternately.

From the lower part of the cylinders *d* 1, *d* 2, *d* 3, *d* 4, come out necks turning upward archwiſe, as *g g g g*, whoſe upper parts are caſt with flanches to ſcrew up to the trunk *h h h h*; which necks have bores of ſeven inches diameter, and holes in the trunk above communicating with them, at which joining are placed four valves. The trunk is caſt with four boſſes, or protuberances, ſtanding out againſt the valves to give room for their opening and ſhutting; and on the upper ſide are four holes ſtopped with plugs, to take out on occaſion, to cleanſe the valves. One end of this trunk is ſtopped by a plug *i*. To the other, iron pipes are joined, as *i* 2, by flanches, through which the water is forced up to any height or place required.

Beſides theſe four forcers, there are four more placed at the other ends of the libræ, or levers (not ſhewn here, to avoid confuſion, but to be ſeen on the left hand) the rods being fixed at *a* 1, 2, 3, 4, working in four cylinders, with their parts *d d*, &c. *e e*, *f*, *g g*, and *i*, as before deſcribed, ſtanding near *k k*.

At the other end of the wheel (at B) is placed all the ſame ſort of work as at the end A is deſcribed, viz.

The cog-wheel I.
The trundle K.
The ſpindle X.
The crank Y, Z.
The ſucking-pipes *f*.
The four levers *a c*, *a c*, &c.
Eight forcing rods, *a d*, *a d*, &c.
Eight cylinders, *d e*, *d e*, &c.
Four trunks, ſuch as *e e*, *h h*.
Two forcing pipes, as *i*.

So that one ſingle wheel works 16 pumps. All which work could not be drawn in one perſpective view, without making it very much confuſed.

A calculation of the quantity of water raiſed by the engines at London-Bridge.

In the firſt arch next the city is one wheel with double work of — — —	16	forcers
In the third arch: Firſt wheel double work at one end, and ſingle at the other —	12	
In the third arch: Second wheel in the middle — — — — — — — —	8	
In the third arch: Third wheel — — — — — — — — — — —	16	
In all	52	forcers
One revolution of a wheel makes in every forcer — — — — — —	$2\frac{1}{5}$	ſtrokes
So that one turn of the four wheels makes — — — — — — — —	114	ſtrokes
When the river is at beſt, the wheels go ſix times round in a minute, and but $4\frac{1}{2}$ at middle water — — — — — — — — — — —	6	
The number of ſtrokes in a minute — — — — — — — — —	684	
The ſtroke is $2\frac{1}{2}$ feet in a ſeven inch bore, raiſes — — — — — —	3	
They raiſe per minute — — — — — — — — — — — —	2052	ale gallons.

That

That is, 123120 gallons = 1954 hogſheads per hour, and at the rate of 46896 hogſheads in a day, to the height of 120 feet.

This is the utmoſt quantity they can raiſe, ſuppoſing there were no imperfections or loſs at all.

But it is certain, from the conſiderations following, that no engine can raiſe ſo much as will anſwer the quantity of water the cylinder contains in the length of the forcer's, or piſton's motion. For,

Firſt, opening and ſhutting of the valves loſe nearly ſo much of that column, as the height they riſe and fall.

Secondly, no leather is ſtrong enough for the piſton, but there muſt commonly ſlip, or ſqueeze by, ſome water, when it is raiſed to a great height; and, when the column is ſhort, it will not preſs the leather enough to the cylinder, or barrel: but, eſpecially at the beginning or firſt moving of the piſton, there is ſo little weight on it, that, before the leather can expand, there is ſome loſs.

Thirdly, and this loſs is more or leſs, as the piſtons are looſer or ſtraiter leathered.

Fourthly, when the leathers grow too ſoft, they are not capable of ſuſtaining the pillar to be raiſed.

Fifthly, if they are leathered very tight, ſo as to looſe no water, then a great part of the engine's force is deſtroyed by friction.

By ſome experiments accurately made on engines, whoſe parts are large and excellently performed, they will loſe one fifth, and ſometimes one fourth of the calculated quantity.

However, the perfections or errors of engines are to be compared together, by the calculated quantities of forces; for as they differ in thoſe, they will proportionably differ in their actual performances.

The power by which the wheels are moved.

The weight of the pillar of water on a forcer ſeven inches diameter and 120 feet high.

$7 \times 7 = 49$ lb. The pounds avoirdupoiſe in a yard, nearly.
40 yards high.

1960 lb. on one forcer
8 forcers always lifting

The whole weight 15680 lb. = 140 Cwt. = 7 ton weight on the engine at once.
Then the crank pulls the libra 3 feet from the forcer, and 8,3 feet from the center,

7 ton
× 11.3

8,3)79.1(9,5. ton on the crank
Wallower — — — — 2,2)9,5(4,3 ton on trundle
The ſpur wheel — — — — 4

Radius of the great wheel — 10)17,2(1,72 tun
20

The force on the floats 18 Cwt. 40lb. 34,40 Cwt.
But to allow for friction and velocity, may be reckoned 1 ton $\frac{1}{2}$
The ladles, or paddles, 14 feet long, 18 inches deep, = 22,4 ſquare feet.
The fall of water is at a mean — — — 2 feet.
44,8

6 gallons in a cubic foot.

268,8
10, lb. in a gallon.

112) 2688 (24 hundred.

The velocity of the water, 4 feet in $21'''$ of time.
$21''' - 4$ feet : : $- 60''$: = 685 feet per minute.
The velocity of the wheel = 310 feet per minute.
Quantity expended on the wheel, according to the velocity of the ſtream, 1433 hogſheads per ſecond.
But at the velocity of the wheel 645 hogſheads per ſecond.
The velocity of the wheel to the velocity of the water, as 1 to 2, 2.

Fig. 1. plate XCV. repreſents a curious machine for raiſing water, executed at Nynphenbourg, by the count de Whal, maſter of the works to the elector of Bavaria. It raiſes water ſixty feet high into a reſervoir, for the uſe of the elector's gardens.

The water of the canal, falling down the inclined plane at Q, turns the large wheel repreſented in the figure, the circumference of which, by cogs, moves the arbor D, and the ſame on the other ſide; to thoſe are faſtened the piſtons of ſixteen forcing pumps G, four on each ſide the arbor, as repreſented in the figure.

From each of theſe pumps is a tube, through which the water is forced into the pipe O, and from thence through the pipe P, which conveys it into the reſervoir. Theſe pumps are faſtened together by pieces of timber, with iron clamps, to make them firm, as may be ſeen in the figure.

This is a very good machine, and deſerves to be imitated, either in whole or in part, when water is to be raiſed.

WATERING, in the manufactures, is to give a luſtre to ſtuffs, &c. by wetting them lightly with gum-water, and then paſſing them through the preſs, or calender, whether hot or cold.

The gum-water ought to be pure, thin, and clear, otherwiſe the folds of the ſtuff will ſtick together: the operation muſt alſo be performed when the water is very hot, that it may penetrate.

WAVE, *Unda*, in philoſophy, a cavity in the ſurface of water, or other fluid, with an elevation aſide thereof. See the article FLUID.

Sir Iſaac Newton explains the nature of waves in water after the following manner: Let A B and C D (plate XCIII. fig. 2. N° 1.) be the ſurface of water quieſcent in the upright leg K L, M N, of a received tube; and if the water be put into motion, and aſcends in the leg K L to E F, it will deſcend in the leg M N to G H; ſo that E A = D H. Again, let P V be a pendulum vibrating in the cycloid R P S, its length V P, from the point of ſuſpenſion to the center of oſcillation, is equal to half the length of the water in the tube; let P be the loweſt point, and P Q an arch of the cycloid, equal to the altitude A E.

The force by which the water is alternately accelerated and retarded in its motion in the tube, is the exceſs of the weight of water in either leg above the weight in the other; and, therefore, when the water in the leg K L aſcends to E F, and in the other leg deſcends to G H, that force is equal to the weight of the two equal quantities of water A E F B + C G H D = 2 A E F B; and, therefore, it is to the weight of the whole water, as E A to V P, or as P Q to P R; becauſe the ſemi-cycloid P R is equal to the length of the pendulum which deſcribes it, from the nature of the curve.

All the power by which the weight P is in any point Q accelerated or retarded in the cycloid, is, to its whole weight, as the diſtance P Q from the loweſt point P, to the length of the ſemi-cycloid P R. Wherefore, ae the moving forces of the water and pendulum are at firſt quieſcent, thoſe powers will move them equally in equal times, and cauſe that they go forwards and backwards together with a reciprocal motion: all which is eaſily deduced from what has been ſaid of the nature of the cycloid, the motion of heavy bodies, and the forces of bodies in motion.

Hence it follows, that whether the diſtance A E be great or ſmall, the reciprocations of the water will all be performed in equal times.

Alſo, it follows, that if the whole length of the water be 78,4 inches, each reciprocation, or aſcent and deſcent of the water, will be performed in one ſecond of time; becauſe a pendulum of half that length vibrates in that time.

Laſtly, if the length of the aqueous canal be increaſed or diminiſhed, the time of each reciprocation will be increaſed or diminiſhed in the ſubduplicate ratio of the length.

When the nature of waves in water is conſidered, it will be found to agree very nearly with the motion of the water in the tube above-mentioned; and, conſequently, their motion will be ſimilar to that of a pendulum. For let E F G (N°. 2.) repreſent the level ſurface of water when it is not agitated ſo as to produce waves; when it is thus agitated, let A B C D repreſent the wavy ſurface, A C the higheſt parts of the waves, and B D the loweſt or concave part. Then it is evident, the weight of the water at A above E G will cauſe it to deſcend as far below the level to B; and with the motion acquired by that deſcent, it will again aſcend to the ſame height C, and ſo produce a conſtant ſucceſſion of waves in the watery ſurface, after the ſame manner as was ſhewn in the tube.

Hence it follows, that becauſe the length of the whole water to be moved, is from the higheſt point A to the loweſt point B, if the length of a pendulum be half A B, it will oſcilate once while the water deſcends from A to B; and in another oſcillation, it will aſcend from B to C; and ſo on. So that a wave will paſs through its whole length in the time of two oſcillations; and, therefore, in the time of one oſcillation of a pendulum four times as long, or equal to A B C.

Whence, becauſe A B C, in very large and wide waves, is nearly equal to the breadth A C; therefore, when the waves are 39,2 inches broad, they will undulate in one ſecond of time; and, conſequently, ſince the times of all the undulations are equal, there will be 39,2 + 60 = 2352 inches, or 196 feet, run through by a wave in one minute; which is 11760 feet per hour.

Hence, alſo, the velocity of greater or leſſer

waves

Fig. 1. Astronomical Watch.

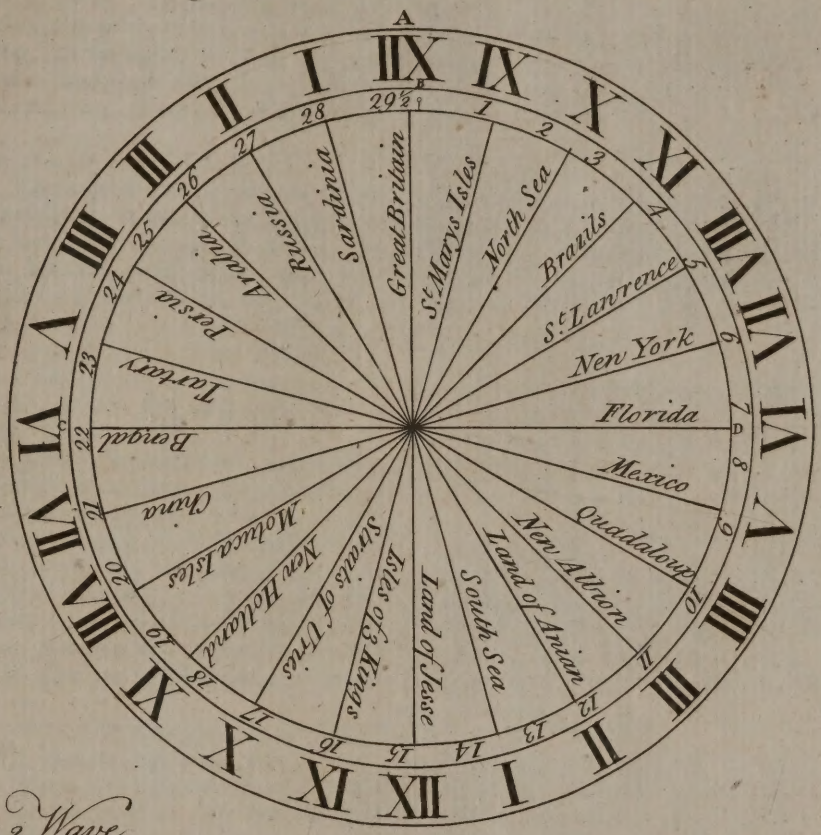
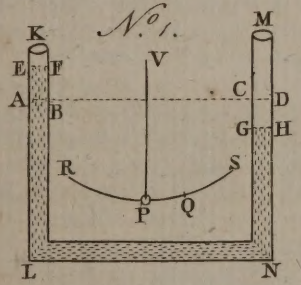


Fig. 2. Wave.

No. 1.



No. 2.

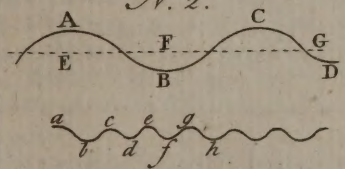


Fig. 3. Wedge.

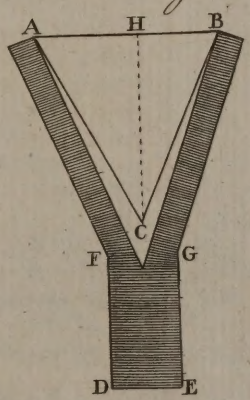
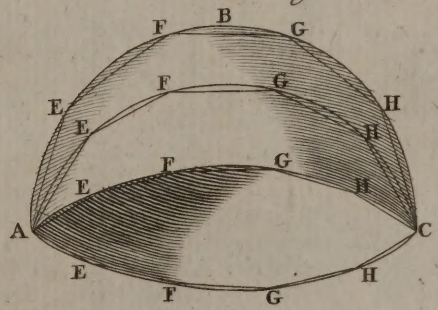
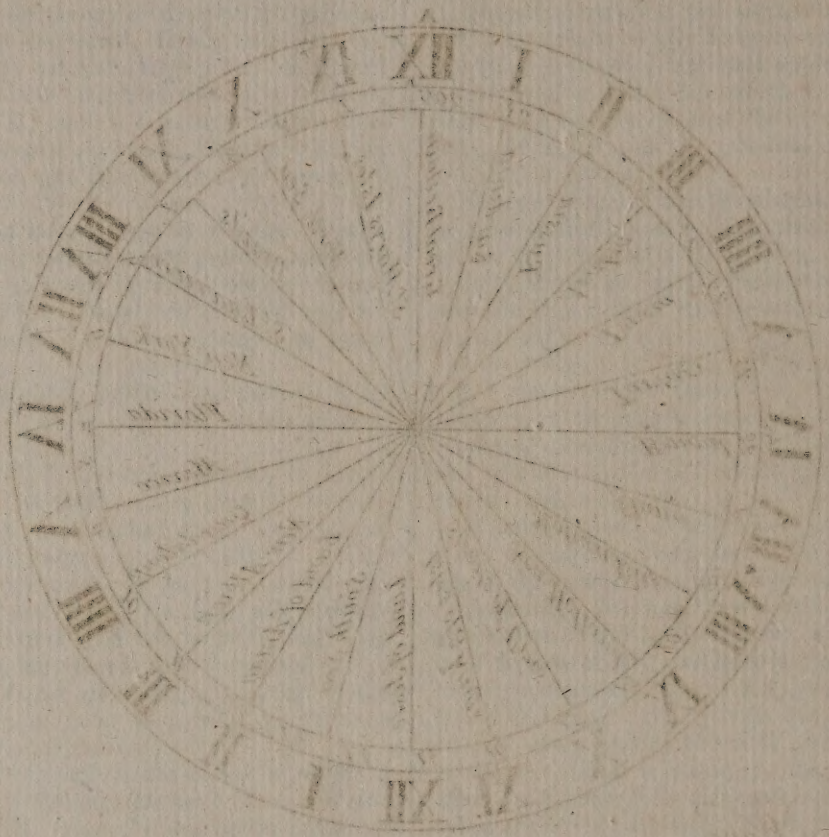
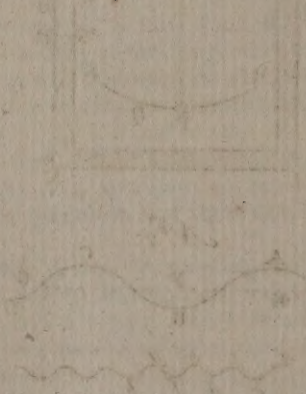


Fig. 4. Whispering Place.



T. Lodge sculp.





waves will be increaſed or diminiſhed in the ſubduplicate proportion of their breadth; that is, if V = velocity of the greater waves A B C D, and v = velocity of the leſſer waves *a. b. c. d. e. f.* &c. then it will be $V : v :: \sqrt{AC} : \sqrt{ac}$. Becauſe the velocities and times of bodies moved in any manner by gravity, are proportional to the ſquare roots of the perpendicular altitudes, and thoſe altitudes are as the lengths of pendulums; and, therefore, as the breadth of waves.

The waves of the ſea are of two kinds, natural and accidental. The natural waves, are thoſe which are exactly proportioned in ſize to the ſtrength of the wind, whoſe blowing gives origin to them. The accidental waves, are thoſe occaſioned by the wind's re-acting upon itſelf by repercuſſion, from hills and mountains, or high ſhores, and by the waſhing of the waves themſelves, otherwiſe of the natural kind, againſt rocks and ſhoals: all theſe caſes give the waves an elevation, which they can never have in their natural ſtate.

Mr. Boyle has proved, by numerous experiments, that the moſt violent wind never penetrates deeper than ſix feet into the water; and it ſhould ſeem a natural conſequence of this, that the water moved by it can only be elevated to the ſame height of ſix feet from the level of the ſurface in a calm: and this ſix feet of elevation being added to the ſix of excavation, in the part whence that water ſo elevated was raiſed, ſhould give twelve feet for the utmoſt elevation of a wave.

This is a calculation that does great honour to its author; for count Marſigli meaſured carefully the elevation of the waves near Provence, and found that, in a very violent tempeſt, they aroſe only to ſeven feet above the natural level of the ſea, and this additional foot in height he eaſily reſolved into the accidental ſhocks of the water againſt the bottom, which was, in the place he meaſured them in, not ſo deep as to be out of the way of affecting the waves; and he allows, that the addition of one-ſixth of the height of a wave, from ſuch a diſturbance from the bottom, is a very moderate alteration from what would have been its height in a deep ſea; and concludes, that Mr. Boyle's calculation holds perfectly right in deep ſeas, where the waves are purely natural, and have no accidental cauſes to render them larger than their juſt proportion.

In deep water, under the high ſhores of the ſame part of France, this author found the natural elevation of the waves to be only five feet; but he found, alſo, that their breaking againſt rocks, and other accidents, to which they were liable in this place, often raiſed them to eight feet high.

We are not to ſuppoſe, from this calculation, that no wave of the ſea can riſe more than ſix feet above its natural level in open and deep water; for waves immenſely higher than theſe are formed, in violent tempeſts, in the great ſeas. Theſe, however, are not to be accounted waves in their natural ſtate, but they are ſingle waves formed of many others; for in theſe wide plains of water, when one wave is raiſed by the wind, and would elevate itſelf up to the exact height of ſix feet, and no more, the motion of the water is ſo great, and the ſucceſſion of the waves ſo quick, that, during the time this is riſing, it receives into it ſeveral other waves, each of which would have been at the ſame height with itſelf; theſe run into the firſt wave, one after another, as it is riſing: by this means its riſe is continued much longer than it naturally would have been, and it becomes terribly great. A number of theſe complex waves ariſing together, and being continued in a long ſucceſſion, by the continuation of the ſtorm, makes the waves ſo dangerous to ſhips, which the ſailors, in their phraſe, call mountains high.

WAVE-OFFERING, in Jewiſh antiquity, a ſacrifice offered by agitation, or waving, towards the four cardinal points of the compaſs. See the article SACRIFICE.

WAVED, WAVY, or WAVEY, in heraldry, is ſaid of a bordure, or any ordinary, or charge, in a coat of arms, having its out-lines indented, in manner of the riſing and falling of waves; it is uſed to denote, that the firſt of the family in whoſe arms it ſtands, acquired its honours for ſea-ſervice.

WAVING, in the ſea-language, is the making ſigns to a veſſel to come near, or keep off.

WAVREN, or GAVEREN. See the article GAVEREN.

WAVY. See the article WAVED.

WAX, or *Bees*-WAX, in natural hiſtory, a firm and ſolid ſubſtance, moderately heavy, and of a fine yellow colour, formed by the bees from the farina of flowers, which they work up and compreſs into a maſs, or ſort of cake, and of which they form their honey-combs; from whence it is obtained by heating and ſtraining them through a linen cloth, or by preſſing them betwixt iron plates, &c.

The beſt ſort is that of a lively yellow colour, and an agreeable ſmell, ſomewhat like that of honey: when new it is toughiſh, yet eaſy to break; but by age it becomes harder and more brittle, loſes its fine colour, and in a great meaſure its ſmell. See the article HONEY COMB.

From the common yellow wax, by the mere effect of ſun and air, or by what is call bleeching, is formed what we term white-wax, and ſome, very improperly, virgin-wax. As the greater the ſurface is in proportion to the quantity, the ſooner and more perfectly this operation is performed. The uſual way is to melt the wax in hot water; when melted, they preſs it through a ſtrainer of tolerable fine linen, and pour it into round and very ſhallow moulds. When hardened by cooling, it is taken out and expoſed to the ſun and air, ſprinkling it now and then with

with water, and often turning it; by this means, it ſoon becomes white. The beſt ſort is of a clear and almoſt tranſparent whiteneſs, dry, hard, brittle, and of an agreeable ſmell, like that of the yellow wax, but much weaker.

The common yellow wax is of very great uſe, both in medicine and many of the arts and manufactures. It is ſometimes given internally, as in dyſenteries, and other eroſions of the inteſtines; but its great uſe is in the making of ointments and plaſters for external uſe, and the greater part of thoſe of the ſhops owe their conſiſtence to it. The white wax is alſo an ingredient in ſome of the cerates and ointments of the ſhops; and is uſed in making candles, and in many of the nicer arts and manufactures, where wax is required.

Preparations of WAX. The butter and oil of wax are thus prepared: Cut the wax in pieces and put them into a retort, which muſt be half filled with theſe pieces; and the reſt of the retort being filled with ſand, it muſt be placed in a ſand furnace. At firſt, an acid ſpirit ariſes, and afterwards a thick oil, called the butter of wax, ſticks in the neck of the retort, unleſs it be heated by applying a live coal. This may be rectified into a thin oil, by diſtilling it ſeveral times, without addition, in a ſand heat.

The butter is an extremely ſoft and anodyne unguent, highly emollient and relaxing, agreeable to the nerves, and, when rubbed on contracted limbs, proves of great benefit to them. It is an excellent liniment for the piles, and takes off the pain attending them in a very ſudden and ſurprizing manner. It alſo keeps the ſkin ſoft, and is one of the beſt things known to keep it from cracking or chopping in the winter.

The oil of wax, has alſo a very ſingular virtue in curing contracted tendons and reſtoring flexibility to the parts. It cures chapped nipples in women who give ſuck beyond any other application, and it is as ſucceſsful againſt chapped lips, and the cracking of the ſkin of the hands, only rubbing them once in three or four days with it. It is alſo of great uſe in diſcuſſing cold tumours ariſing on the face, and thoſe on the fingers in winter.

Sealing WAX is made in the following manner: Take one pound of bees-wax: three ounces of fine turpentine; olive-oil, and roſin finely powdered, of each one ounce: when they are well melted, and the droſs taken off, put in an ounce and a half of vermillion, or red-lead, finely ground, and ſtir them together till they are well incorporated: and when this mixture grows a little cool, roll it into ſticks, or in any other form. If you would have it black, inſtead of vermillion, or red-lead, put in lamp-black. The ſoft, red, and green wax, uſed in large ſeals to ſome of our old law-writings, are thus made: Melt bees-wax over a gentle heat, with ſuch a proportion of Venice turpentine as, when cold, will give it the due conſiſtence: this is determined by repeated trials, firſt putting in but little turpentine, and afterwards more and more, till by dropping a piece upon a marble to cool, it is found of the true conſiſtence. They then colour it with red-lead, or vermillion, or with verditer, or whatever colours they pleaſe; the mixture in this ſtate reciving any.

Grafting-WAX, a compoſition ſerving to bind the graft to the cleft of the ſtock. For the manner of making which, ſee the article *Methods of* GRAFTING.

To imitate Fruit in WAX. Take the fruit and bury it half way in clay; oil its edges, and that part of that part of the fruit which is uncovered; then nimbly throw on it tempered alabaſter or plaſter of Paris, to a conſiderable thickneſs. When this is grown dry and hard, it makes the half mould; the ſecond half of which may be obtained in the ſame manner. The two parts of the mould being joined together, a little bees-wax melted and brought to a due heat, being poured through a hole made in a convenient part of the mould, and preſently ſhook therein, will repreſent the original fruit.

WAX-WORK, the repreſentation of the faces, &c. of perſons living or dead; made by applying plaſter of Paris in a kind af paſte, and thus forming a mould containing the exact repreſentation of the features. Into this mould melted wax is poured, and thus a kind of maſks are formed; which being painted and ſet with glaſs eyes, and the figures dreſſed in their proper habits, they bear ſuch a reſemblance that it is difficult to diſtinguiſh between the copy and the original.

WAXING, in chemiſtry, the preparation of any matter to render it fit and diſpoſed to liquify, or melt, which of itſelf it was not.

This is frequently done to enable things to penetrate into metals and other ſolid bodies.

WAY, a paſſage or road. See ROAD.

The Roman ways are divided into conſular, prætorian, military, and public; and of theſe we have four remarkable ones in England, viz.

The firſt, Watling-ſtreet, or Watheling-ſtreet, leading from Dover to London, Dunſtable, Touceſter, Atterſton, and the Severn, extending itſelf as far as Angleſea in Wales.

The ſecond, called Hikenild, or Ikenild-ſtreet, ſtretches from Southampton over the river Iſis at Newbridge; thence by Camden and Lichfield; then paſſes the Derwent, near Derby, and ends at Tinmouth.

The third, called Foſſe-way (becauſe in ſome places it was never perfected, but lies as a large ditch) leads from Cornwal through Devonſhire, by Tethbury, near Stow in the Wolds; and beſide Coventry to Leiceſter, Newark, and ſo to Lincoln.

The fourth, called Erming, or Erminage-ſtreet,

extends from St. David's, in Wales, to Southampton.

High WAY. See HIGHWAY.

Milky-WAY. See GALAXY.

WAY *of a Ship*, is ſometimes the ſame as her rake, or run, forward or backward: but this term is moſt commonly underſtood of her ſailing. Thus when ſhe goes a-pace, it is ſaid that ſhe hath a good way, or makes a freſh way. So when an account is kept how faſt ſhe ſails by the log, it is called keeping an account of her way; and becauſe moſt ſhips are apt to fall a little to leeward of their true courſe, they always in caſting up the log-board, allow ſomething for her leeward way.

WAY *of the Rounds*, in fortification, is a ſpace left for the paſſage of the rounds between the rampart and the wall of a fortified town. This is not now much in uſe; becauſe the parapet, not being above a foot thick, is ſoon overthrown by the enemy's cannon.

WAY-WISER, an inſtrument otherwiſe called perambulator. See the article PERAMBULATOR.

WAY-WODE, a title given to the governors of the chief places in the empire of Muſcovy, as alſo in Poland.

WAYFARING-TREE, the Engliſh name for the common viburnum. See VIBURNUM.

WEAR, or WEER, a great ſtank or dam in a river, fitted for the taking of fiſh, or for conveying the ſtream to a mill.

New wears are not to be made, or others altered, to the nuſance of the public, under a certain penalty.

WEASEL, in zoology, a ſpecies of muſtela, with the tip of the tail black. See the article MUSTELA.

This is a ſmaller animal than the pole-cat: the head is ſmall, of an ovated form, and ſharp at the ſnout: the ears are ſmall, ſhort, and patulous; the eyes of a fierce aſpect; the mouth well furniſhed with teeth; the upper jaw longer than the under: the body is about eight inches long, and ſlender: the tail is a third part the length of the body; the legs are ſhort and ſlender; the feet have five toes armed with ſharp claws; the whole body is covered with a fine and tolerably long fur: the back is of a darkiſh colour, and the belly is white.

WEATHER, the ſtate or diſpoſition of the atmoſphere with regard to heat, cold, wind, rain, froſt, &c.

As it is in the atmoſphere that all plants and animals live, and as that appears to be the great principle of moſt animal and vegetable productions, alterations, &c. there does not ſeem any thing, in all philoſophy, of more immediate concernment to us than the ſtate of the weather, and a knowledge of the great influence it has on our bodies. What vaſt, but regular, alterations a little turn of weather makes in a tube filled with mercury, or ſpirits of wine, or in a piece of ſtring, &c. every body knows, in the common inſtance of barometers, thermometers, &c. and it is owing partly to our inattention, and partly to our unequal and intemperate courſe of living, that we do not feel as great and regular ones in the tubes, chords, and fibres of our own bodies.

WEATHER-COCK, or WEATHER-VANE, a moveable vane in form of a cock, or other ſhape, placed on high, to be turned round according to the direction of the wind, and point out what quarter the wind blows from. See WIND.

WEATHER-GLASSES, are inſtruments contrived to indicate the ſtate or diſpoſition of the atmoſphere, and the various alterations in the weather; ſuch are barometers, thermometers, hygrometers, &c.

WEATHER-GAGE, in the ſea-language. See GAGE.

WEATHERING, among ſailors, ſignifies the doubling, or ſailing by a head-land, or other place.

WEAVING, the art of working a web of cloth, ſilk, or other ſtuff, in a loom with a ſhuttle.

WEAVING-LOOM, a machine for weaving cloth, ſilk, &c. by raiſing the threads of the warp in order to throw in the ſhoot, and ſtrike it cloſe. Of theſe there are various kinds, diſtinguiſhed by the different ſorts of cloths, ſtuffs, ſilks, &c. in which they are employed, and which are chiefly diſtinguiſhed by the number and variety of the threads they raiſe in order to work the warp, either plain or in figures, by making more or leſs of the woof or ſhoot appear through the warp.

In order to give a general idea of weaving, we ſhall here deſcribe the parts of the common weaver's loom. See plate LXXXIX. fig. 9. in which 9, 9, are the loom-poſts; 10, the croſs-bars; 11, the batten, which ſerves to ſtrike in, and cloſe more or leſs the threads of the woof; 12, the cap of the batten, or a long bar, which the weaver takes hold of in one hand and then in the other; 13, the block, or under part of the ſame, containing the reed within the lower bar; 14, the croſs-piece, or burdon and pin, which helps to make the batten moveable; 15, the gallows, a piece of wood ſuſpending the pulley, on which the cord moves that is tied to the two lams; 16, the breaſt-bar, a flat ſquare piece of wood, with an opening in it to let the ſtuff through, which is rolled on the knee-roll; 17, the cane-roll, which the warp is turned on at the other end of the loom; 18, the reed; 19, pullies upon which the cords roll that are faſtened to the lams; 20, the tumbler, which is a cord that paſſes from one lam to the other over the pulley 21, and cauſes the working of the lams by its aſcending and deſcending; 22, the muffle, in which the pully acts; 23, a ſkain, or leiſh, cut into proper lengths, to mend the leiſhes of the harneſs that happen to break; 24,

a bobbin of the warp, to mend the threads of the warp that occaſionally break; 25, lizard-thread, to mend thoſe of the lizier that happen to break, and which, eſpecially in cloth, are very different from the warp; 26, the box to hold the quills; 27, the foot-bar; 28, the trundles, or moveable bars, tied with two cords to the lower virgee of each lam. When the foot preſſes a treadle, the lam that is faſtened to it ſinks, and the other riſes by the help of the tumbler. 29, the foot-ſtep; 30, the temple, a double flat ruler, having ſmall teeth at the extremities; it may be lengthened or ſhortened by the help of a catch that is in one of the rulers, and introduced in a groove in the other ruler. The teeth in the extremities are faſtened in the lizier of the work, by which means it is kept of an equal breadth; and as the work advances, the temple is moved forwards; 31, the ſhuttle, ſeen in front and profile; 32, the knee-roll, on which the work is rolled as it is wove; 33, the tantow, an iron lever to turn the knee-roll; 34, the reed, ſeen ſeparate.

WEB, a ſort of tiſſue, or texture formed of threads interwoven with each other; ſome whereof are extended in length, and called the warp; and others drawn acroſs, and called the woof. See the articles CLOTH, WARP, &c.

Spider's WEB, or COBWEB. See the article COBWEB.

WEDGE, *Cuneus*, one of the mechanical powers, as they are called. See POWER.

The wedge is a triangular priſm, whoſe baſes are equilateral acute-angled triangles. See the article PRISM.

The power of the wedge ACBH (pl. XCIII. fig. 3.) is evident, from its conſiſting of two equal inclined planes, AHC and BHC: but as it is chiefly uſed to ſeparate the adhering parts of wood, the coheſion of which is every where variable and uncertain, there can be no regular calculation of the actual effect of the wedge, in this caſe. But if we ſuppoſe the power of coheſion in the wood ADEB to be uniform, or to make every where an equal reſiſtance to the wedge ABC, dividing its parts AF and BG; then the power of the wedge would be to the reſiſtance of the wood, as their velocities inverſely, that is, as the ſpaces moved through in the ſame time, that is, as the height of the wedge HC to half its width AH.

WEDNESDAY, the fourth day of the week, ſo called from a Saxon idol named Woden, ſuppoſed to be Mars, worſhipped on this day.

Aſh-WEDNESDAY, the firſt day of Lent, ſo called from the cuſtom obſerved in the ancient Chriſtian church, of penitents expreſſing their humiliation at this time, by appearing in ſack-cloth and aſhes. The want of this diſcipline is at preſent ſupplied by reading publicly on Aſh-Wedneſday the curſes denounced in ſcripture againſt the ſeveral ſorts of ſins, the people repeating after each curſe, Amen.

WEED, a common name for all rank and wild herbs, that grow of themſelves, to the detriment of other uſeful herbs they grow among.

WEED, in the miners language, denotes the degeneracy of a load or vein of fine metal into an uſeleſs marcaſite.

WEEK, *Septimana*, *hebdomada*, in chronology, a diviſion of time compriſing ſeven days.

The origin of this diviſion of weeks, or of computing time by ſevenths, is greatly controverted. Some will have it to take its riſe from the four quarters or intervals of the moon, between her changes or phaſes, which, being about ſeven days diſtance, gave occaſion to the diviſion.

Be this as it will, the diviſion is certainly very ancient. The Syrians, Egyptians, and moſt of the oriental nations, appear to have uſed it from all antiquity: though it did not get footing in the Weſt till Chriſtianity brought it in: the Romans reckoned their days not by ſevenths but by ninths, and the ancient Greeks by decads or tenths.

Indeed, the Jews divided their time by weeks, but it was upon a different principle from the eaſtern nations. God himſelf appointing them to work ſix days, and to reſt the ſabbath, in order to keep up the ſenſe and remembrance of the creation; which being effected in ſix days, he reſted the ſeventh.

Paſſion-WEEK, or the *Holy* WEEK, is the laſt week in Lent, wherein the church celebrates the myſtery of our Saviour's death and paſſion.

WEIGH, WAY, or WEY, *Waga*, a weigh of cheeſe, wool, &c. containing 256 pounds avoirdupoiſe. Of corn, the weigh contains forty buſhels; of barley or malt, ſix quarters. In ſome places, as Eſſex, the weigh of cheeſe is 300 pounds.

WEIGHER, an officer in divers cities appointed to weigh the commodities bought or ſold in a public balance.

WEIGHING, the act of examining a body in the balance to find its weight.

WEIGHING-CHAIR, a machine contrived by Sanctorius, to determine the quantity of food taken at a meal, and to warn the feeder when he had his quantum.

WEIGHING *Anchor*, is the drawing it out of the ground it had been caſt into, in order to ſet ſail, or quit a port, road, or the like.

WEIGHT, gravity, *Pondus*, in phyſics, a quality in natural bodies whereby they tend downwards, towards the center of the earth.

Or, Weight may be defined, in a leſs limited manner, to be a power inherent in all bodies whereby they tend to ſome common point, called the center of gravity; and that with a greater or leſs velocity, as they are more or leſs denſe, or as the medium they paſs through is more or leſs rare.

In the common uſe of language, weight and gravity are conſidered as one and the ſame thing. Some authors, however, make a difference between them; and

and hold gravity only to expreſs a niſus, or endeavour to deſcend, but weight an actual deſcent. But there is room for a better diſtinction. In effect, one may conceive gravity to be the quality as inherent in the body; and weight the ſame quality, exerting itſelf either againſt an obſtacle, or otherwiſe. Hence, weight may be diſtinguiſhed, like gravity, into abſolute and ſpecific. See GRAVITY.

Sir Iſaac Newton demonſtrates, that the weights of all bodies, at equal diſtances from the center of the earth, are proportionable to the quantities of matter each contains. Whence it follows, that the weights of bodies have not any dependence on their forms, or textures; and that all ſpaces are not equally full of matter. Hence, alſo, it follows, that the weight of the ſame body is different, on the ſurface of different parts of the earth; by reaſon its figure is not a ſphere, but a ſpheroid. See EARTH.

WEIGHT, *Pondus*, in mechanics, is any thing to be raiſed, ſuſtained, or moved by a machine, or any thing that in any manner reſiſts the motion to be produced.

WEIGHT, in commerce, denotes a body of a known weight, appointed to be put in the balance againſt other bodies, whoſe weight is required.

The ſecurity of commerce depending, in great meaſure, on the juſtneſs of weights, which are uſually of lead, iron, or braſs, moſt nations have taken care to prevent the falſification thereof, by ſtamping or marking them by proper officers, after being adjuſted by ſome original ſtandard. Thus, in England, the ſtandard of weights is kept in the Exchequer, by a particular officer called the clerk of the market. See the article CLERK.

Weights may be diſtinguiſhed into ancient and modern, foreign and domeſtic.

Ancient WEIGHTS, 1. Thoſe of the ancient Jews, reduced to the Engliſh troy weights, will ſtand as in the following table:

			lb. oz. dwt. gr.
Shekel			00 00 09 $02\frac{4}{7}$
60	Maneh		02 03 06 $10\frac{3}{7}$
3000	50	Talent	113 10 01 $10\frac{3}{7}$

2. Grecian and Roman weights, reduced to Engliſh troy-weight, will ſtand as in the following table.

									oz. dwt. gr.
Lentes									00 00 $\frac{8}{11}\frac{5}{2}$
4	Siliquæ								00 00 $03\frac{1}{2}\frac{1}{8}$
12	3	Obolus							00 00 $09\frac{3}{2}\frac{3}{8}$
24	6	2	Scriptulum						00 00 $18\frac{3}{1}\frac{3}{4}$
72	18	6	3	Drachma					00 00 $06\frac{9}{1}\frac{9}{4}$
96	24	8	4	$1\frac{1}{3}$	Sextula				00 03 $00\frac{5}{7}$
144	36	12	6	2	$1\frac{1}{2}$	Sicilicus			00 04 $13\frac{2}{7}$
192	48	16	8	$2\frac{2}{3}$	2	$1\frac{1}{3}$	Duella		00 06 $01\frac{5}{7}$
576	144	48	24	18	16	4	3	Uncia	00 18 $05\frac{1}{7}$
6912	1728	576	288	96	72	48	36	12	Libra 10 18 $13\frac{5}{7}$

The Roman ounce is the Engliſh avoirdupois ounce, which they divided into ſeveral denarii, as well as eight drachms; and ſince they reckoned their denarius equal to the Attic drachm, this will make the Attic weights one-eighth heavier than the correſponding Roman weights. See AVOIRDUPOIS and TROY.

Modern European WEIGHTS. 1. Engliſh weights: By the twenty-ſeventh chapter of Magna Charta, the weights all over England are to be the ſame; but for different commodities, there are two different ſorts, viz. avoirdupois-weight and troy-weight. The origin from which they are both raiſed, is a grain of wheat, gathered in the middle of the ear.

In troy-weight, twenty-four of theſe grains make one penny-weight ſterling; twenty penny-weights make one ounce; and twelve ounces one pound.

By this weight we weigh gold, ſilver, jewels, grains, and liquors. The apothecaries alſo uſe the troy pound, ounce, and grain; but they differ from the reſt in the intermediate diviſions. They divide the ounce into eight drachms; the drachm into three ſcruples, and the ſcruple into twenty grains.

In avoirdupois-weight, the pound contains ſixteen ounces; but the ounce is leſs, by near one-twelfth, than the troy ounce; this latter containing 490 grains, and the former only 448. The ounce contains 16 drachms. 80 ounces avoirdupois are only equal to 73 ounces troy; and 17 pounds troy equal to 14 pounds avoirdupois.

By avoirdupois-weight are weighed mercury and grocery wares, baſe metals, wool, tallow, hemp, drugs, bread, &c.

Table of Troy-WEIGHT, *as uſed by the Goldſmiths*:

Grains		
24	Penny-weight	
480	20	Ounce
5760	240	12 Pound.

Table of Troy-WEIGHT, *as uſed by the Apothecaries:*

Grains				
20	Scruple			
60	3	Drachm		
480	24	8	Ounce	
5760	288	96	12	Pound.

Table of Avoirdupois-WEIGHT.

Scruples				
3	Drachm			
24	8	Ounce		
384	128	16	Pound	
43008	14336	1792	112	Quintal, or Hundred
860100	286720	35840	2240	20 Ton.

The moneyers, jewellers, &c. have a particular claſs of weights, for gold and precious ſtones, viz. carat and grain; and for ſilver, the penny-weight and grain. See the article CARACT.

The moneyers have alſo a peculiar ſubdiviſion of the grain troy, viz.

The { Grain, Mite, Droit, Perit } into { 20 Mites, 24 Droits, 20 Perits, 24 Blanks. }

The dealers in wool have likewiſe a particular ſet of weights, viz. the ſack, weigh, tod, ſtone, and clove.

2. French weights: The common or Paris pound is 16 ounces; which they divide two ways: the firſt diviſion is into two marcs; the marc into 8 ounces; the ounce into 8 gros; the gros into 3 penny-weights; the penny-weight into 24 grains; the grain equal to a grain of wheat. The ſecond diviſion of the pound is into 2 half pounds; the half pound into 2 quarters; the quarter into 2 half quarters; the half quarter into 2 ounces; and the ounce into 2 half ounces.

The weights of the firſt diviſion are uſed to weigh gold, ſilver, and the richer commodities; and the weights of the ſecond diviſion, for commodities of leſs value.

Grains					
24	Penny-weight				
72	3	Gros			
576	24	8	Ounce		
4608	192	64	8	Marc	
9216	384	128	16	2	Pound.

Half ounce						
2	Ounce					
4	2	Half-quarter pound				
8	4	2	Quarter pound			
16	8	4	2	Half pound		
32	16	8	4	2	Pound	
3200	1600	800	400	200	100	Quintal.

But the pound is not the ſame throughout France. At Lyons, the city pound is only 14 ounces; ſo that 100 Lyons pounds make only 88 Paris pounds. But beſide the city pound, they have another at Lyons for ſilk, containing 16 ounces. At Tholouſe, and throughout the Upper-Languedoc, the pound is 13 ounces and a half of Paris weight. At Rouen, beſide the common Paris pound and marc, they have the weight of the vicomte; which is 16 ounces, a half, and five-ſixths of the Paris weight.

The weights, enumerated under the two articles of Engliſh and French weights, are the ſame that are uſed throughout the greateſt part of Europe; only under ſomewhat different names, diviſions, and proportions.

Particular nations have alſo certain weights peculiar to themſelves: thus Spain has its arrobas, containing 25 Spaniſh pounds, or one-fourth of the common quintal: its quintal macho, containing 150 pounds, or one-half common quintal, or 6 arrobas: its adarme, containing one-ſixteenth of its ounce. And for gold, it has its caſtillan, or one-hundredth of a pound: its tomin, containing 12 grains, or one-eighth of a caſtillan. The ſame are in uſe in the Spaniſh Weſt-Indies.

Portugal has its arroba, containing 32 Liſbon arratels, or pounds. Savary alſo mentions its faratelle, containing 2 Liſbon pounds; and its rottoli, containing about 12 pounds. And for gold, its chego, containing four carats. The ſame are uſed in the Portugueſe Eaſt-Indies.

Italy, and particularly Venice, have their migliaro, containing four mirres; the mirre, containing 30 Venice pounds: the ſaggio, containing a ſixth part of an ounce.

Genoa has five kinds of weights, viz. large weights, whereby all merchandizes are weighed at the cuſtom-houſe: caſh-weights for piaſtres, and other ſpecies: the cantara, or quintal, for the coarſeſt commodities: the large balance for raw ſilks; and the ſmall balance for the finer commodities. Sicily has its rotollo, 32 and a half pounds of Meſſina.

Germany, Flanders, Holland, the Hanſe-Towns, Sweden, Denmark, Poland, &c. have their ſchippondt, which at Antwerp and Hamburgh, is 300 pounds;

pounds; at Lubeck, 320; and at Coningſberg, 400 pounds. In Sweden, the ſchippondt for copper is 320 pounds; and the ſchippondt for proviſions 400 pounds. At Riga and Revel, the ſchippondt is 400 pounds; at Dantzic, 340 pounds; in Norway, 300 pounds; at Amſterdam, 300; containing 20 lyſpondts, each weighing 15 pounds.

In Muſcovy, they weigh their large commodities by the bercheroct, or berkewits, containing 400 of their pounds. They have alſo the poet, or poede, containing 40 pounds, or one-tenth of the bercheroct.

In order to ſhew the proportion of the ſeveral weights uſed throughout Europe, we ſhall add a reduction of them to one ſtandard, viz. the London and Amſterdam pound.

1. Proportion of the weights of the principal places of Europe:

The 100 *lb.* of England, Scotland, and Ireland, are equal to

lb.	*oz.*	
91	8	of Amſterdam, Paris, &c.
96	8	of Antwerp or Brabant
88	0	of Rouen, the viſcounty weight
106	0	of Lyons, the city weight
90	9	of Rochelle
107	11	of Toulouſe, and Upper-Languedoc
113	0	of Marſeilles or Provence
81	7	of Geneva
93	5	of Hamburgh
89	7	of Francfort, &c.
96	1	of Leipſic, &c.
137	4	of Genoa
132	11	of Leghorn
153	11	of Milan
152	0	of Venice
154	10	of Naples
97	0	of Seville, Cadiz, &c.
104	13	of Portugal
96	5	of Leige
112	$\frac{2}{3}$	of Ruſſia
107	$\frac{1}{24}$	of Sweden
89	$\frac{1}{2}$	of Denmark.

2. Proportion of the weights of the chief cities in Europe, to thoſe of Amſterdam. An 100 pounds of Amſterdam are equal to

lb.

108 of Alicant
105 of Antwerp
120 of Archangel, or 3 poedes
105 of Arſchot
120 of Avignon
98 of Baſil in Switzerland
100 of Bayonne in France.
166 of Bergamo
97 of Bergen-op-zom
95$\frac{1}{4}$ of Bergen in Norway
111 of Bern
100 of Baſançon

100 of Bilboa
105 of Bois le duc
151 of Bologna
100 of Bourdeaux
104 of Bourgen Breſſe
103 of Bremen
125 of Breſlaw
105 of Bruges
105 of Bruſſels
105 of Cadiz
105 of Cologne
125 of Coningſberg
107$\frac{1}{2}$ of Copenhagen
87 rottos of Conſtantinople
113$\frac{1}{2}$ of Dantzic
100 of Dort
97 of Dublin
97 of Edinburgh
143 of Florence
98 of Francfort on the Maine
105 of Gaunt
89 of Geneva
163 of Genoa, caſh weight
102 of Hamburgh
106 of Leyden
105 of Leipſic
105$\frac{1}{2}$ of Leige
114 of Liſle
143 of Leghorn
106$\frac{1}{2}$ of Liſbon
109 of London, avoirdupois weight
105 of Lovaine
105 of Lubec
141$\frac{1}{2}$ of Lucca, light weight
116 of Lyons, city weight
114 of Madrid
105 of Marlines
123$\frac{1}{2}$ of Marſeilles
154 of Meſſina, light weight
168 of Milan
120 of Montpelier
125 bercheroct of Muſcovy
100 of Nantes
106 of Nancy
169 of Naples
98 of Nuremberg
100 of Paris
112$\frac{1}{2}$ of Revel
109 of Riga
100 of Rochelle
146 of Rome
100 of Rotterdam
96 of Rouen, viſcounty weight
100 of St. Malo
100 of St. Sebaſtian
158$\frac{1}{2}$ of Seragoſa
106 of Seville
114 of Smyrna
110 of Stetin

81 of Tholouſe and Upper-Languedoc
125 of Turin
158½ of Valencia
182 of Venice, ſmall weight.

WEIGHTS, *uſed in the ſeveral parts of Aſia, the Eaſt-Indies, China, Perſia*, &c.—In Turky, at Smyrna, &c. they uſe the batman, or battemant, containg 6 occos; the occo weighing 3 pounds four fifths Engliſh. They have another batman much leſs, conſiſting, as the former of 6 occos; but the occo only containing 15 Engliſh ounces: 44 occos of the firſt kind make the Turkiſh quintal.

At Cairo, Alexandretta, Aleppo, and Alexandria, they uſe the rotto, rotton, or rottoli. The rottoli at Cairo, and other parts of Egypt, is 144 drachms; being ſomewhat over an Engliſh pound. At Aleppo there are three ſorts of rottos; the firſt, 720 drachms, making about 7 Engliſh pounds, and ſerving to weigh cotton, galls, and other large commodities; the ſecond, is 624 drachms, uſed for all ſilks but white ones, which are weighed by the third rotto of 700 drachms. At Seyda the rotto is 600 drachms.

The other ports of the Levant, not named here, uſe ſome of theſe weights; particularly the occo, or ocqua, the rottoli, and rotto.

The Chineſe weights are, the piece, for large commodities; it is divided into 100 catis, or cattis; though ſome ſay, into 125; the cati into 16 taels, or tales; each tael equal to 1 ⅓ of an Engliſh ounce, or the weight of 1 rial and $\frac{1}{11\frac{1}{2}}$, and containing 12 mas, or maſſes, and each mas 10 condrins. So that the Chineſe piece amounts to 137 Engliſh pounds avoirdupois, and the cadi to 1 pound 8 ounces. The picol for ſilk, containing 66 catis and ¾; the bahar, bakaire, or barr, containing three hundred catis.

Tonquin has alſo the ſame weights, meaſures, &c. as China. Japan has only one weight, viz. the cati; which, however, is different from that of China, as containing twenty taels.

At Surat, Agra, and throughout the ſtates of the great mogul, they uſe the man, or maund, whereof they have two kinds; the king's man, or king's weight; and the man ſimply; the firſt uſed for the weighing of common proviſions, containing forty ſeers, or ſerres; and each ſeer a juſt Paris pound. The common man uſed in the weighing of merchandize, conſiſts likewiſe of 40 ſeers, but each ſeer is only eſtimated at 12 Paris ounces, or ¾ of the other ſeer.

The man may be looked upon as the common weight of the Eaſt-Indies, though under ſome difference of name, or rather of pronunciation; it being called mao at Gambaya, and in other places mein, and maun. The ſeer is properly the Indian pound, and of univerſal uſe: the like may be ſaid of bahar, racl, and catti, above-mentioned.

The weights of Siam, are, the piece, containing 2 ſhans, or cattis; but the Siameſe catti is only half the Japoneſe; the latter containing 20 taels, and the former only 10: though ſome make the Chineſe catti only 16 taels, and the Siameſe 8. The tael contains four baats or ticals; each about a Paris ounce; the baat 4 ſelings, or mayonnes; the mayon 2 fouangs; the fouang 4 payes; the paye 2 clams; the ſompaye ½ a fouang.

It is to be obſerved, that thoſe are the names of their coins as well as weights; ſilver and gold being commodities there ſold, as other things, by their weights.

In the Iſle of Java, and particularly at Bantam, they uſe the gantan, which amounts to near three Dutch pounds.

In Golconda, at Viſapour, and Goa, they have the furatelle, containing 1 pound 14 ounces Engliſh; the mangalis, or mangelin, for weighing diamonds and precious ſtones; weighing at Goa 5 grains, at Golconda, &c. 5½ grains. They have alſo the rotolo, containing 14¼ ounces Engliſh; the metricol, containing the ſixth part of an ounce; the wall, for piaſters and ducats, containing the ſeventy-third part of a rial.

In Perſia, they uſe two kinds of batmans, or mans; the one called cahi, or cheray, which is the king's weight; and the other, batman of Tauris. The firſt 13 pounds 10 ounces Engliſh; the ſecond, 6½ pounds. Its diviſions are, the ratel, or a 16th; the derhem, or drachm, which is the 50th; the meſchal, which is half the derhem; the dung, which is the 6th part of the meſchal, being equal to ſix carat grains; and, laſtly, the grain, which is the fourth part of the dung. They have alſo the vakie, which exceeds our ounce a little; the ſah-cheray, equal to the 1170th part of the derhem; and the toman, uſed to weigh our large payments of money, without telling; its weight is that of fifty abaſſis.

African and American weights. We have little to ſay as to the weights of America; the ſeveral European colonies there making uſe of the weights of the ſtates or kingdoms they belong to. For, as to the aroue of Peru, which weighs 27 pounds, it is evidently no other than the Spaniſh arroba, with a little difference in the name.

As to the weights of Africa, there are few places that have any, except Egypt, and the countries bordering on the Mediterranean; whoſe weights have been already enumerated among thoſe of the ports of the Levant. The Iſland of Madagaſcar, indeed, has weights, but none that exceed the drachm, nor are they uſed for any thing but for gold and ſilver.

WEIGHT *of the Air*. See AIR.

WEINMANNIA, in botany, a genus of plants, whoſe flower conſiſts of four equal petals larger than the cup; the ſtamina are eight erect and ſhort filaments, topped with roundiſh antheræ; the fruit is an

an ovate biroſtrate capſule, having two cells containing eight roundiſh ſeeds.

WELD, or dyers-weed, *luteola*, in botany, a plant whoſe root is ſingle, white, and woody, with a few fibres; the leaves are oblong, narrow, ſmooth and entire; among theſe riſe ſtalks to the height of three feet; theſe are round, hard, ſmooth, greeniſh, branched, and furniſhed with leaves that are leſs than thoſe below. The flowers are produced on the tops of the ſtalks; they are of a beautiful yellowiſh green colour, and of the ſame form as thoſe of the reſeda, of which it is now held a ſpecies. See RESEDA.

It is very common in England, and grows upon dry banks, and on the tops of walls and buildings.

The ſeeds of weld ſhould be ſown in Auguſt, ſoon after they are ripe; they will come up the firſt moiſt weather, and will grow very ſtrong the ſame autumn, provided they are ſown by themſelves. When they are pretty ſtrong, they ſhould be hoed out, as is practiſed with turneps, to deſtroy the weeds, and to thin them where too thick. The ſeed muſt not be too ripe when gathered, for then it will fall out; nor yet muſt the ſtalk be unripe, for then it will be good for nothing. It muſt be bound in handfuls, and ſet to dry like flax, taking care not to ſhake out the ſeeds, which are uſually ſold at ten ſhillings a buſhel; and a gallon will ſow an acre.

It is of great uſe among the dyers, for dying bright yellow and lemon colours; a great quantity of it is ſown in ſome parts of Kent; and they cultivate it in Languedoc and Normandy in France, where they boil it in water, with allum, and then it will colour white wool yellow, and blue ſtuffs green.

In medicine it is ſaid to be opening, and to be good againſt the jaundice and cachexy, but is ſeldom uſed here.

WELDING-HEAT, in ſmithery, a degree of heat given to iron, &c. ſufficient only for bending, or doubling it up.

WELL, a hole under ground, uſually of a cylindrical form, walled with ſtone and mortar: its uſe is to collect the water of the ſtrata around it.

WELL, in the military art, a depth which the miner ſinks under ground, with branches or galleries running out from it; either to prepare a mine, or to diſcover and diſappoint the enemy's mine.

WELL-HOLE, in building, is the hole left in a floor for the ſtairs to come up through. See the article STAIRS.

WEN, a tumor or excreſcence that ariſes on different parts of the body, and contains a cyſtus, or bag filled with ſome peculiar matter, of which phyſicians reckon three kinds, viz. when this matter is ſoft, reſembling pulp, the wen is called atheroma; if like honey, meliceris; and if like ſuit, ſteatoma. See the article TUMOUR.

WERE, in our old law-books, denotes a ſum paid for killing a perſon, when ſuch crimes were puniſhed with pecuniary mulct, and not death.

WERELADA, among our Saxon anceſtors, the denying an homicide on oath, in order to be quit of the fine called WERE.

WERGILD, or WEREGELD, in our ancient cuſtoms, the price of a man's head; a part of which was paid to the king, for the loſs of his ſubject, a part to the lord whoſe vaſſal he was, and a part to the neareſt relation of the perſon ſlain.

WEST, in coſmography, one of the cardinal points of the horizon, diametrically oppoſite to the eaſt; and ſtrictly defined, the interſection of the prime vertical with the horizon, on that ſide the ſun ſets in. See HORIZON.

In aſtronomy, weſt is chiefly uſed for the place in, or towards which, the ſun or ſtars ſink under the horizon. Thus we ſay, the ſun, mars, &c. are in the weſt. The point the ſun ſets in, when in the equator, is particularly called, the equinoctial weſt, or point of true weſt. See the article EQUINOCTIAL.

In geography, weſt and weſtern, are applied to ſeveral countries, &c. ſituate towards the point of ſun-ſetting, with reſpect to certain others. Thus the Roman empire was anciently, and the German empire is at preſent, called the empire of the weſt, or the weſtern empire, in oppoſition to that of Conſtantinople, which is called the eaſtern empire.

The Roman church is called the weſtern church, in oppoſition to the Greek church. The Italians, French, Spaniards, &c. are called weſtern nations, in reſpect to the Aſiatics; and part of America, the Weſt-Indies, in reſpect to the Eaſt-Indies.

WHALE, *Balæna*, in ichthyology. See the article BALÆNA.

The balæna, with the fiſtula in the middle of the head, and the back ridged toward the tail, is the fiſh determinately and properly called the whale, though the phyſeter (as well that with the upper jaw longeſt, and with a long ſpine on the back, as that with the back-fin very tall, and the ſummit of the teeth plane) is the former, called the crooked-toothed whale, and the latter, the plane-toothed whale; as is alſo that phyſeter which is a ſpecies of the balæna. See PHYSETER.

The balæna, or the whale properly ſo called, grows to a monſtrous ſize; the head is extremely large, and of an irregular figure, the lower jaw is much larger than the upper, and covers it at the ſides; the upper, is narrow and oblong, the fiſtula is double, or has two diſtinct apertures, and is ſituated in the middle of the head, between the eyes; the eyes are very ſmall in proportion to the enormous bulk of the head, and are placed a great diſtance from one another; the whole head is ſomewhat depreſſed, and has ſeveral irregularities on its ſurface; the body is very thick, and ſomewhat rounded;

rounded; but towards the extremity of the back, there is a ſubacute angle, extending itſelf longitudinally to the tail; the tail is ſomewhat forked, very large, and in its horizontal ſituation makes a very ſingular figure. This is an inhabitant of the northern ſeas, the principal object of the Greenland fiſhery, and the firſt known ſpecies.

WHALE-BONE, or as it is otherwiſe called, whale-fins, in commerce, a commodity procured from the whale; uſed as ſtiffening in ſtays, fans, buſks, ſkreens, &c. What we call whale-bone, or fins, is a horny laminæ in the upper-jaw of the balæna, which ſupply the place of teeth, but there are none ſuch in the lower-jaw. Theſe laminæ are commonly called whiſkers, which, ſplit and faſhioned, are the whale-bone. The pizzle, or genital member of the animal, ſerves likewiſe for the ſame purpoſe.

WHARF, a ſpace on the banks of a haven, creek, or hithe, provided for the convenient loading and unloading veſſels upon.

The fee paid for the landing of goods on a wharf, or for ſhipping them off, is called wharfage, and the perſon who has the direction and overſight of the wharf, receives wharfage, &c. is called the wharfinger.

WHEAT, *Triticum*, in botany, a genus of plants, the corolla of which conſiſts of two valves, nearly equal in ſize, and of the bigneſs of thoſe which form the cup; the exterior valve is bellied, with an obtuſe end terminated by a point, and the inner valve is plane; the ſtamina are three capillary filaments, topped with oblong bifurcate antheræ; the piſtillum conſiſts of a turbinated germen, ſupporting two hairy reflexed ſtyles, each crowned with a plumoſe ſtigma; there is no pericarpium, the corolla incloſing the ſeed, which is ſingle, of an ovato-oblong form, blunt at the ends, convex on one ſide and furrowed on the other.

There are ſeveral kinds of wheat; as the white or red wheat without awns; the red-eared, the bearded wheat, the cone wheat, grey wheat, or ducks-bill wheat, Poland wheat, many-eared wheat, ſummer wheat, long-grained wheat, white-eared wheat, naked barley-wheat, with ſome other ſorts. The ſeaſon for ſowing wheat is in autumn, and the earlier the better, if the weather is moiſt, as leſs ſeed is required to an acre than when it is ſown late, becauſe leſs of it will die; and poor land ſhould always be allowed more ſeed than rich, becauſe a greater number of the plants will periſh on ſuch land than an the other. Another thing to be conſidered in order to find the proper quantity of ſeed, is, that ſome kinds of wheat has its grains twice as large as others; in this caſe, a buſhel containing but half the number of grains that it does in the ſmall-grained wheat, one buſhel of the ſmall-grained will plant juſt as much as two buſhels of this; therefore the ſize of the ſeeds ought to be regarded as well as the meaſure.

It might be ſuppoſed, that a large grained wheat will produce larger and finer plants than the ſmall-grained ſort, but experiments have proved that there is nothing in this, for the ſmalleſt grained wheat produces fully as large plants as the other. The uſual allowance of ſeed-wheat to one acre of land, is three buſhels; but, from repeated trials, it has been found that half that quantity is ſufficient; therefore if the farmers have regard to their own intereſt, they ſhould ſave this expence of ſeed, which amounts to a conſiderable article in large farms, eſpecially when it is to be purchaſed, which moſt of the ſkilful farmers do at leaſt every other year, by way of change; for they find that the ſeeds continued long upon the ſame land, will not ſucceed ſo well as when they procure a change of ſeeds from a diſtant country; and in the choice of the ſeed, particular regard ſhould be had to the land on which it grew, for if it is light land, the wheat which grew upon ſtrong land is the beſt, and *vice verſa*.

There are four ways of augmenting the crops of wheat, not only in the number of the plants, but in the ſtalks, ears, and grains; the firſt is by increaſing the number of ſtalks, from one, two, or three, to thirty or forty in each plant, in ordinary field land; and the crop is augmented by bringing up all theſe ſtalks into one ear, which is the ſecond way; for if it be diligently obſerved, it will be found, that not one half of the ſtalks of wheat ſown in the common way, never come to ear at all: nay, if a ſquare yard of ſown wheat be marked out, and the ſtalks thereon numbered in the ſpring, it will be found that no leſs than nine parts in ten of them are wanting at harveſt time.

An experiment of the advantage of this augmentation was made by Mr. Tull in rows of wheat where the land was equally poor; one of theſe rows was increaſed ſo much, as to produce more grains than ten of the other, by bringing up more of its ſtalks into ears, and alſo by augmenting the ears to a much greater bigneſs, which is the third way; for it is very certain that the ears will be much larger or much ſmaller, according to the quantity of nouriſhment given them.

The fourth and laſt way of increaſing the crops of wheat, is by cauſing the grain to be much larger in the ears. This can no way be ſo effectually done as by late hoeing, eſpecially if it be done juſt after the wheat is gone out of bloſſom; by this means the grains will weigh twice as much as thoſe produced in the ſame ſort of wheat when this late hoeing has been omitted; their number is the ſame in the ear, and as the wheat is ſold not by tale but by meaſure, the farmer's gain is double in this caſe, the wheat meaſuring twice as much as it would otherwiſe have done.

Thus

Thus by increaſing the number of the ſtalks, bringing more of them up into the ear, making the ears larger, and the grains larger, plumper, and fuller in every ear, the method of horſe-hoeing, by which alone this can be effected, makes a larger crop out of the tenth part of the number of plants than in the common way

But all theſe advantages will be loſt by thoſe, who, though they give into the horſe-hoeing way, yet will not allow breadth enough between the rows; for it is owing to their having a large ſpace of ground alone, that as much nouriſhment may be given to to the wheat as the farmer pleaſes.

Poor light land muſt be extremely well manured, in order to the maintaining wheat a year (which is the uſual time that it is on it) if the wheat is ſown in the common broad-caſt way; and if it be ſown late, the greater part of it periſhes, not being able to ſurvive the winter while ſo poor and on ſuch land: and if it be ſown in the ſame manner very early on ſtrong rich land, many of the plants are deſtroyed. But the new method of horſe-hoeing gives both to ſtrong and to light land all the advantages neceſſary, and takes off all the diſadvantages of both; by this method the ſtrong land may be planted with wheat as early as the light, if plowed dry; and the hoe-plough, if rightly applied, will be able to give it nouriſhment almoſt equal to that of dung in both ſorts of land.

The uſe of wheat is univerſal, it making better bread than any other corn, being more glutinous and nutritious.

However, in the eaſtern countries they generally prefer rice thereto, for which reaſon it is not ſo much cultivated there, eſpecially among the original inhabitants; not but it will grow well; for it has been juſtly obſerved, by the ancients as well as moderns, that wheat will grow in almoſt any part of the world; and that as it is the plant moſt neceſſary to mankind, ſo it is the moſt general and the moſt fruitful. It grows well not only in the temperate climates, but in the very hot and very cold ones; and when in places where it never grew ſpontaneouſly, ſucceeds as well as where it has been always common. But where it was originally a native it is not eaſy to determine, though it is generally ſuppoſed that ſome part of Africa is the country, becauſe in the earlieſt accounts we have of it, there is mention of its being tranſported from thence to other countries; and Sicily was the firſt country in Europe where this grain was cultivated.

The price of wheat in this country varies continually, and this variation is often very great in the ſpace of one or two years; ſo that from being ſo cheap as that the farmers could not pay their rents, in the compaſs of a year or two the price has been doubled; for one or two plentiful harveſts have lowered the price of wheat ſo much, as to make it difficult for the needy farmer to go on with his buſineſs, who wants ready money for his crops as ſoon as he can prepare them for market. This has eſtabliſhed a ſet of people called *Dealers in corn*, who have taken the advantage of the farmer's neceſſity, and engroſſed their corn to keep it for better markets; and theſe dealers have of late years increaſed ſo greatly in their numbers, to the great prejudice of the raiſers and conſumers of corn, as may in time prove of the worſt conſequence, by monopolizing the greateſt part of the produce, and then ſet their own price upon it; ſo that between corn-factors, as they are called, and the diſtillers, together with the monopolizers of farms, the price of bread may be too great for the labouring poor; which is a conſideration that requires more public attention than it has hitherto met with.

Though wheat is of ſuch very great uſe as an aliment, it is but little uſed in medicine, except as a cataplaſm; which is made with the crumb of bread ſoaked in milk, with the yolks of eggs and ſaffron; this is good to eaſe painful ſwellings, and to abate inflammations. Some put the grains of wheat between two hot plates of iron, and expreſs a ſort of oil, which is affirmed to be excellent againſt ring-worms, and for healing chaps in the ſkin. For the manner of grinding, &c. wheat, ſee the articles GRINDING, MILL, FLOUR, &c.

Buck-WHEAT. See the article BUCK-*Wheat*.

Indian-WHEAT. See ZEA.

White-Cone WHEAT, a term uſed by our huſbandmen to expreſs a peculiar kind of wheat, which is very ſtrong, and has a large ear.

It is the beſt kind for ſowing in fields ſubject to the blight; for the ſtalks of it being, for the moſt part, ſolid or full of pith like a ruſh, not hollow like thoſe of common wheat; the inſects that cauſe the blight ſeizing on the ſtalks of other wheat, does this no injury, even though they ſhould attack it; the ſtalks of this kind being often found full of black ſpecks, which are always the marks of the inſect having been there, and yet the ear full, and the grain good.

This wheat makes very good bread, if the miller does not grind it too ſmall, or the baker make his dough too hard; it requiring to be ſomewhat larger than other wheat-flower, and ſomewhat ſofter in the dough. A buſhel of white cone-wheat will make conſiderably more bread than a buſhel of lammas-wheat; but it gives it ſomewhat of a yellowiſh caſt.

Smyrna-WHEAT, a peculiar kind of wheat that has an extremely large ear, with many leſſer or collateral ears coming all round the bottom of the great one.

As this is the largeſt of all ſorts of wheat, ſo it will diſpenſe with the nouriſhment of a garden, without being overfed, and requires more nouriſh-

ment than common husbandry in the large way can give it. In the common way, its ears grow not much larger than those of the common wheat.

This sort of wheat seems, of all others, the most proper for the new method of horse-hoeing husbandry, as that method seems capable of giving as much nourishment as the farmer pleases, by often repeating the hoeing. Next to this, the white-cone wheat is best for this sort of husbandry; then the grey-cone wheat.

WHEAT-EAR, in ornithology, the English name of a species of motacilla, with a grey, black, and white forehead. See the article MOTACILLA.

WHEEL, *Rota*, in mechanics, a simple machine, consisting of a round piece of wood, metal, or other matter, which revolves on an axis. The wheel is one of the principal mechanic powers; it has place in most engines; in effect, it is of an assemblage of wheels that most of our engines are composed. For the theory of this mechanic power, called axis and wheel, see AXIS *in Peritrochio*.

For the theory of clock-wheels, watch-wheels, mill-wheels, &c. see the articles CLOCK, MILL, &c,

With regard to the wheels of coaches, waggons, &c. otherwise called wheel-carriages, the whole doctrine thereof may be reduced to the following particulars; viz. 1. Wheel-carriages meet with less resistance than any other. 2. The larger the wheel, the easier is the draught of the carriage. 3, A carriage upon four wheels of equal size, is drawn with less force than with two of those wheels and two of a lesser size. 4. If the load be laid on the axle of the larger wheels, it will be drawn with less force than if it had laid on the axis of the lesser wheels, contrary to the common notion of loading carriages before. 5. The carriage goes with much less force on friction wheels than in the common way, all which will be confirmed by experiments. The wheels of carriages must be exactly round, and the fellies should be at right angles to the naves, according to the inclination of the spokes; that is, the plane of the curvature of the wheel should cut the nave at right angles, though it need not pass through the space where the spokes are inserted into the nave. 1. It is a general rule in all cases that the wheels be exactly round; for if they were not so, but like E F G H (plate XCV. fig. 1.) and the nave out of the center, it is certain, that such a wheel in turning, would be affected in the same manner upon plane ground as other wheels are when they rise and fall, and would not be in equilibrio; the wheel turning towards H would move with as much difficulty as if there was a rise to ascend; and that height being passed, it would fall on a sudden, as if a square stone was rolled along, and the jolts of the wheel would precipitate and push the horses at one time, and immediately increase their difficulty of drawing the next moment, and that in proportion to the wheels being out of round: yet if the nave should not be in the middle, the shortest part, as F, being on the ground; when such a wheel begins to turn, the weight must be raised in the same manner as when another carriage is going up an hill: and from F to D, or quite to G, the wheel would act like a wedge; and at D, or G, it would fall and drive on the horses as in a steep descent.

2. The fellies must not cross wind, but be at right-angles with the naves, according to the inclination of the spokes; for otherwise the wheel, in turning, would find inequalities, as it happens when the hole of the nave is too big, and the wheel moves from side to side; which comes to the same purpose as if the wheel was out of round; and when the inequality of the spokes, which would be too leaning or too straight, upon the nave descending into a hole, or rising upon an eminence, opposite to their inclination, would cause them, or the fellies, to break.

3. The spokes must be inclined to the naves, that the wheels may be dishing or concave. If the wheels always turned upon smooth and even ground, it is certain that the spokes ought to be straight upon the naves; that is, at right-angles to their axes; because then they would bear perpendicularly, like the spoke B (fig. 2.) of the nave A C, which is the strongest way for wood.

But because the ground is unequal, and when the wheels fall into the ruts, that wheel which is in the rut bears a greatly part of the weight than the other, because it is lower: in such case, the spokes of a dishing-wheel become perpendicular in the rut, and therefore have the greatest strength; whilst the opposite wheel, being upon higher ground, bears a less part of the weight; and, consequently, the spokes need not be at their full strength, and so will have a sufficient force, though that force be less than what they have upon even ground.

4. The axle-tree must be straight in all respects, and at right-angles to the shafts or to the pole. In the motion of all bodies, there is one way of moving which is the easiest of all the rest, and happens here when the axle-tree is every way straight; for if its ends should bend backwards, so as bring the wheels nearer together behind, as A E (fig. 3.) and spread them much before, as D C, it is certain that they could not go into the ruts, nor turn in going forward, or at least with great difficulty, dragging instead of rolling.

There would be the same inconveniences in bending the axle-tree forward, so as to bring them nearer the pole, as I F (fig. 4.) and make them spread behind, as at B D.

The less the axle-tree is bent, the less the inconveniency;

Wheel Carriages.

Fig. 1.

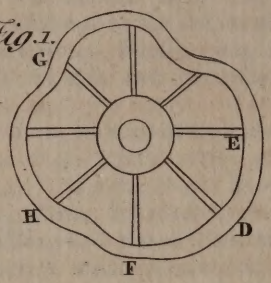


Fig. 2.

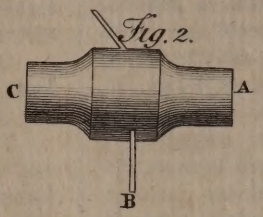


Fig. 3.

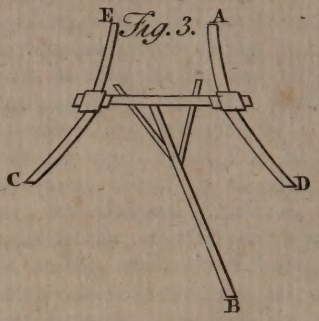


Fig 4

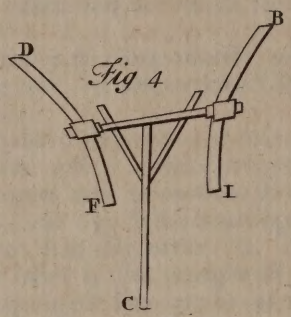


Fig. 5.

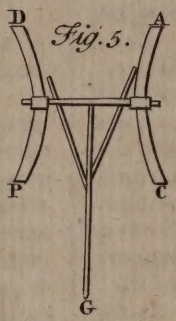


Fig. 6.

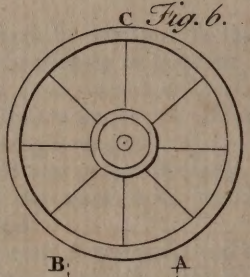


Fig. 7.

Fig. 8.

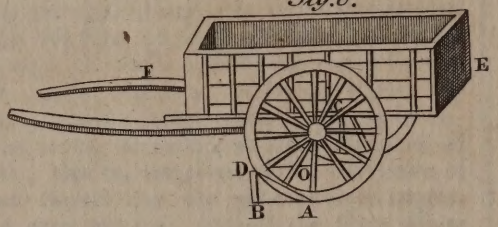


Fig. 9.

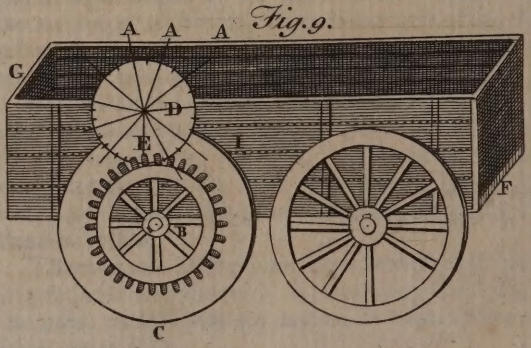


Fig. 10.

J. Lodge sculp.

veniency: but there will always be ſome, when the wheels are not parallel, and there will be no inconveniency when the axle is ſtraight, and the wheels are in the ſituation C P and A D (fig. 5.) The axle muſt alſo be at right-angles to the pole or ſhafts; for if the pole or ſhafts were on one ſide, as at B (fig. 3.) or C (fig. 4.) the coach or carriage would be drawn on one ſide, and almoſt all the weight would bear upon one horſe; but it muſt be at right-angles like the pole G (fig. 5.)

5. Great wheels are always more advantageous for rolling than little ones, in any caſe, or upon any ground whatſoever. The wheels of carriages are conſidered according to the velocity and friction they have upon the axle-tree, and likewiſe according to their reſiſtance, or ſinking in upon the ground.

If we conſider them according to the friction, it is certain, that a wheel whoſe diameter is double that of another, will make but one turn, whilſt the little one makes two for the ſame length of way; the circumference, which is in proportion to the diameter, being double. Therefore, in reſpect to friction, a wheel of double the diameter will have a double advantage, there being but one turn inſtead of two, which doubles the friction in the ſmall wheel. The wheel A B C, being twice as big as the wheel D E F (fig. 6. and 7.) will have twice the advantage in reſpect of the friction, the holes of the nave and axles being equal. See the articles CIRCUMFERENCE and FRICTION.

If we conſider the wheels according as they ſink into the earth, or fall into holes, there will be the ſame advantage for one, and inconveniency for the other. If we conſider the bearing, it is double in the great wheel; therefore it will ſink but half the way: and if we conſider hollows, it will give the ſame advantage in ſome caſes; but then, in others, as, for example, where the holes are deep, the little wheel will have much more diſadvantage: for if it ſhould fall into a great hole, as D E (fig. 6, 7, and 8.) of a diameter equal to that of the wheel, it would wholly ſink in whilſt the great wheel would only fall in the depth of its ſegment A B, which would not be half the wheel, as may be ſeen from the parallel lines A D and B E.

We may ſuppoſe the ſame to happen in marſhy grounds, where a little wheel would ſink wholly in the ſame hole that a great one would ſink but in part.

E F (fig. 8.) is a cart, or carriage; B D, a rub for the wheel C A D to paſs over; A B, the horizontal plane; D B, A C, perpendicular, and O D parallel, to A B, C the center of the wheel. Then the horizontal force required to pull the wheel over the rub B D, is as $\frac{DO}{CO}$; and the difficulty of going over rubs increaſes in a greater ratio than that of their heights. Alſo, the higher the wheels, the more eaſily they paſs over them; but then they are the more apt to overturn.

To draw the cart with the leaſt power over the rub B D, it ſhould not be drawn in the horizontal direction A B or O D, but in the direction A D. The advantage then of high wheels is, that they paſs the rubs moſt eaſily, have the leſs friction, ſink leſs in the dirt, and more eaſily preſs down an obſtacle; and their diſadvantage is, that they eaſily overturn, and make cattle draw too high; for they can apply their ſtrength beſt when they draw low and upwards in the direction A D, which is the advantage of low wheels: yet if the wheels are high, they may be made to draw low, by fixing the limmers or traces as far below the axle as you will, which will then be an equal advantage with low wheels: for the power not pulling at the wheel, but at the carriage, may draw from any part of it. There is another advantage, which is, that they are better to turn with.

A waggon with four wheels is more advantageous than a cart with two wheels, eſpecially on ſand, clay, &c. Narrow wheels and narrow plates are a diſadvantage.

Suppoſe the waggon F G (fig. 9.) is moved forward by a power acting within it, which power turns the wheel D E, by the ſpokes A D, A D, &c. and D E turns the wheel I C, which carries the waggon. Let the power at A be 1, then the force acting at E will be $\frac{DA}{DE}$. Alſo, if the power at E be 1, the force at C, by which the waggon is moved, will be $\frac{BE}{BC}$; therefore the power at A, to the force with which the waggon can be moved, is as 1 to $\frac{DA \times BE}{DE \times BC}$; or the power is to that force, as $DE \times BC$, to $DA \times BE$.

It will be the ſame thing if, inſtead of teeth, the wheel D E carries E B by a chain going round them. You muſt ſuppoſe the like wheels on the oppoſite ſide. Hence, if the abſolute force to move the waggon without, be 1, the force within applied at A to move it, will be $\frac{DE \times BC}{BE \times DA}$.

6. It would be much more advantageous to make the four wheels of a coach or waggon large, and nearly of a height, than to make the fore-wheels of only half the diameter of the hind-wheels, as is uſual in many places, which the following experiment will confirm.

Let us make uſe of a little waggon, or model, of an inch to a foot (repreſented in fig. 10.) with the four wheels of five inches and nine lines; and ſo contrived that one may put on wheels of different diameters; as, for example, four of five inches, two of two inches three lines, two others of three inches,

and

and let them have naves, ſpokes, and fellies, in proportion, to repreſent the wheels of a coach or waggon: let them be changed one after another, the waggon D B being always loaded with the ſame weight, A, of five pounds, and drawn by means of a ſilken thread running over a pulley, with a little bag, or ſcale of a ballance, to put in balls for the different wheels, according as they are to run upon even ground, upon earth, ſand, or pavement. The board A F muſt be of oak, three feet long, plained on one ſide, and carved on the other, to imitate the pavements and the channels of ſtreets. The paving ſtones muſt be of ſeven or eight lines inſtead of ſeven or eight inches, reducing them from inches to lines, as the wheels are reduced from feet to inches. It muſt be ſo contrived that the pulley may be turned to either ſide of the board. The whole being ſo diſpoſed, the ſeveral experiments will anſwer a table, for which we refer the reader to Deſagulier's Courſe of Experimental Philoſophy, vol. i. page 223.

WHEEL is alſo the name of a kind of puniſhment which great criminals are put to in divers countries. In France, their aſſaſſins, parricides, and robbers on the highway, are condemned to the wheel; i. e. to have their bones firſt broken with an iron bar on a ſcaffold, and thus to be expoſed, and left to expire on the circumference of a wheel. In Germany they break their bones on the wheel itſelf.

WHEEL, in the military art, is the word of command, when a battalion or ſquadron is to alter its front either one way or the other. To wheel to to the right, directs the man in the right angle to turn very ſlowly, and every one to wheel from the left to the right, regarding him as their center; and *vice verſa*, when they are to wheel to the left. When a diviſion of men are on the march, if the word be to wheel to the right or to the left, then the right or left hand man keeps his ground; only turning on his heel, and the reſt of the rank move about quick till they make an even line with the ſaid right or left hand man.

WHEEL-ANIMALS, *Brachionus*, a genus of animalcules which have an apparatus of arms for taking their prey. This apparatus has been ſuppoſed by microſcopical writers, to be a kind of wheels; and thence named the creatures that are poſſeſſed of it wheel-animals.

WHEEZING, the name of a diſtemperature in horſes, accounted by the generality of people to be the ſame with that called purſiveneſs. See PURSIVENESS.

WHELP, the young of a dog, fox, lion, or any wild beaſt. Nothing is more eſſential to the having a good pack of hounds, than a proper care of the whelps, and of the parents from which they are to be bred. The bitches in particular ſhould be carefully choſen, and ſhould be ſuch as are ſtrong and well proportioned; they muſt alſo have large ribs and flanks.

The whelps muſt have good freſh ſtraw to lie in, and it muſt be often changed; they are to be kept in a place where neither the rain nor ſunſhine can be troubleſome to them, and once a week it will be proper to anoint them all over with a little nut-oil, with ſome ſaffron infuſed in it. This will prevent the flies from annoying them ſo much as they otherwiſe would, and will kill worms of all kinds. When they are fifteen days old it is the cuſtom to worm them, and a week after, one joint of their ſtern ſhould be twiſted off. As ſoon as they can ſee, they ſhould have milk given them to lap; and at two months old, they ſhould be weaned, keeping them wholly from the bitch. They muſt at this time be well kept, but not too high-fed; and it is proper to put ſome cummin ſeed into their food, to keep the wind out of their bellies.

WHELPS, in a ſhip, the ſeaman's term for thoſe brackets which are ſet up on the capſtan cloſe under the bars; they give the ſweep to it, and are ſo contrived, that the cable winding about them may not ſurge ſo much as it might otherwiſe do, if the body of the capſtan were quite round and ſmooth.

WHETSTONE, *Cos*, a ſtone which ſerves for the whetting of knives and other tools upon.

WHEY, The ſerum, or watery part, of milk.

WHIFFLER, of a company, in London, a young freeman who goes before, and waits on the company on ſolemn aſſemblies.

WHIG, a party in England oppoſite to the tories, from whom they differ chiefly in their political principles. See TORIES.

The names of whig and tory were not known till about the middle of the reign of Charles II. when theſe were given as party diſtinctions. Theſe parties may be conſidered either with regard to the ſtate, or to religion. The ſtate tories are either violent or moderate: the firſt would have the king to be abſolute, and therefore plead for paſſive obedience, non reſiſtance, and the hereditary right of the houſe of Stuart. The moderate tories would not ſuffer the king to loſe any of his prerogative; but then they would not ſacrifice thoſe of the people. The ſtate whigs are either ſtrong republicans or moderate ones. The firſt, ſays Rapin, are the remains of the party of the long parliament, who attempted to change the monarchy to a commonwealth: but theſe make ſo ſlender a figure, that they only ſerve to ſtrengthen the party of the other whigs. The tories would perſuade the world, that all the whigs are of this kind; as the whigs would make us believe that all the tories are violent. The moderate ſtate whigs are much in the ſame ſentiments with the moderate tories,

tories, and desire that the government may be maintained on the ancient foundation: all the difference is, that the first bear a little more to the parliament and people, and the latter to that of the king. In short, the old whigs were always jealous of the incroachments of the royal prerogative, and watchful over the preservation of the liberties and properties of the people.

In regard to religion, the whigs have always been for limiting the power of the bishops, and abolishing the convocation.

WHIN, a name used in the northern parts of England for the ulex, or furze. See the article ULEX.

WHIP, or WHIP-STAFF, in a ship, a piece of timber, in form of a strong staff, fastened into the helm, for the steersman, in small ships, to hold in his hand, in order to move the rudder and direct the ship.

WHIP-GRAFTING. See the article GRAFTING.

WHIRL-POOL, an eddy, vortex, or gulph, where the water is continually turning round. In rivers these are very common, from various accidents, and are usually very trivial, and of little consequence. In the sea they are more rare, but more dangerous.

Sibbald has related the effects of a very remarkable marine whirl-pool among the Orcades, which would prove very dangerous to strangers, though it is of no consequence to the people who are used to it. This is not fixed to any particular place, but appears in various parts of the limits of the sea among those islands. Wherever it appears it is very furious; and boats, &c. would inevitably be drawn in and perish with it; but the people who navigate them are prepared for it, and always carry an empty vessel, a log of wood, or large bundle of straw, or some such thing, in the boat with them: as soon as they perceive the whirl-pool, they toss this within its vortex, keeping themselves out. This substance, whatever it be, is immediately received into the center and carried under water; and as soon as this is done, the surface of the place where the whirl-pool was, becomes smooth, and they row over it with safety; and in about an hour they see the vortex begin again in some other place, usually at about a mile distant from the first. See the articles EDDY and VORTEX.

WHIRL-WIND, a wind that rises suddenly, exceeding rapid and impetuous when risen, but soon spent.

There are divers sorts of whirl-winds, distinguished by their peculiar names; as the prester, typho, turbo, exhydria, and ecnephias.

The prester is a violent wind, breaking forth with flashes of lightening. This is rarely observed; scarce ever without the ecnephias. Seneca says, it is a typho or turbo kindled or ignited in the air.

The ecnephias is a sudden and impetuous wind, breaking out of some cloud, frequent in the Ethiopic sea, particularly about the Cape of Good-Hope. The seamen call them travados.

The exhydria is a wind bursting out of a cloud with a great quantity of water. This only seems to differ in degree from the ecnephias, which is frequently attended with showers.

A typho, or vortex, most properly called whirl-wind, or hurricane, is an impetuous wind, turning rapidly every way, and sweeping all round the place. It usually descends from on high. It is frequent in the Eastern-ocean, chiefly about Siam, China, &c. and renders the navigation of those parts exceeding dangerous.

WHISPERING PLACES, depend upon this principle: if the vibrations of the tremulous body are propagated through a long tube, they will be continually reverberated from the sides of the tube into its axis, and by that means prevented from spreading, till they get out of it; whereby they will be exceedingly increased, and the sound rendered much louder than it otherwise would be.

Hence it is, that sound is conveyed from one side of a whispering-gallery to the opposite one, without being perceived by those who stand in the middle.

The form of a whispering-gallery is that of a segment of a sphere, or the like arched figure; and the progress of the sound through it may be illustrated in the following manner:

Let A B C (plate XCIII. fig. 4.) represent the segment of a sphere; and suppose a low voice uttered at D, the vibrations expanding themselves every way, some will impinge upon the points E, E, &c. and from thence be reflected to the point F, from thence to G, and so on till they all meet in C, and by their union there, cause a much stronger sound than in any part of the segment whatever, even at D, the point from whence they came. Accordingly, all the contrivance in whispering places is, that near the person that whispers there may be a smooth wall, arched either cylindrically or elliptically. A circular arch will do, but not so well.

The most considerable whispering places in England are, the whispering-gallery in the dome of St. Paul's, London, where the ticking of a watch may be heard from side to side, and a very easy whisper be sent all round the dome. The famous whispering place in Gloucester cathedral, is no other than a gallery above the east end of the choir, leading from one side thereof to the other. It consists of five angles and six sides, the middlemost of which is a naked window, yet two whisperers hear each other at the distance of twenty-five yards.

WHIST, a well-known game at cards; so called from the silence observed during the play, which is like that of honours and ruff.

However, as there are many ways of cheating practised in this game, we shall only mention a few,

to put the unwary upon their guard. Some by winking, ſhutting their eyes, placing their fingers, or other ſigns, find means to let their partners know what honours they have got: others have a way of cutting honours either to their partners or to themſelves: the dealer is often crafty enough to conceal ſome honours for himſelf: but the beſt way of rooking is by means of brief cards; for all the honours being ſomewhat broader than the reſt, your adverſary muſt always cut you an honour. See the article HONOURS *and Ruff*.

WHITE, one of the colours of natural bodies. White is not ſo properly ſaid to be any one colour, as a compoſition of all colours; for it is demonſtrated by Sir Iſaac Newton, that thoſe bodies only appear white, which reflect all the kinds of coloured rays alike. See the article WHITENESS.

WHITE, in painting in miniature, &c. The beſt white for painting in water-colours, is flake white, which is better than white lead; and if it be pure, far exceeds it in beauty; becauſe white lead is apt to turn blackiſh, eſpecially if it be uſed in a hard water: but if you uſe white lead, firſt rectify it with white wine vinegar in the following manner: grind well the fineſt white lead upon a porphery with vinegar; then put it into a glaſs of water, ſtir it about, and preſently pour off the water, while it is white, into ſome other clean glaſs, or veſſel; let it ſettle, and then pour of the water from it, and it will be exceeding fine. When this white is ſettled, put to it gum water, to bind it, and to give it a glaze.

Some recommend a white made of the whiter part of oiſter ſhells, reduced into an impalpable powder; this is called pearl-white, and will mix with any colour. Some alſo recommend the powder of egg-ſhells of the brighteſt colour, and well cleaned and waſhed, ground with gum-water, to which may be added about a twentieth part of white ſugar-candy: the egg-ſhells ſhould be ground to an impalpable powder.

Experience ſhews, that egg-ſhell powder is of very great ſervice as a white in water-colours, and both that and the powder of oyſter-ſhells, well rectified and mixed with the white of an egg well beat, will make an extraordinary mixture in other colours, and will correct them from changing or altering their qualities.

WHITE *of the Eye*, denotes the firſt tunic or coat of the eye, called albuginea and conjunctiva, becauſe it ſerves to bind together or incloſe the reſt. See the article EYE.

WHITE-HART-SILVER, a mulct or tribute paid into the Exchequer, out of certain lands in or near the foreſt of White-hart in Dorſetſhire; impoſed by Henry III. upon Thomas de la Linde, for killing a beautiful white hart which that prince had before ſpared in hunting.

WHITE-LEAD, alſo called ceruſe. See the article CERUSE.

WHITE-LINE, among printers, a void ſpace of the depth or breadth of a line. See the article PRINTING.

Spaniſh-WHITE, a kind of fucus uſed by ladies to heighten their complexion, and hide its defects. It is made of tin-glaſs diſſolved in ſpirit of nitre, and precipitated into a very fine powder by means of ſalt water. See the article TIN.

WHITENESS, *Albedo*, the quality which denominates a body white. Sir Iſaac Newton ſhews, that whiteneſs conſiſts in a mixture of all the colours; and that the light of the ſun is only white, becauſe conſiſting of rays of all colours.

From the multitude of rings of colours which appear, upon compreſſing two priſms or object-glaſſes of teleſcopes together, it is manifeſt that theſe do ſo interfere and mingle with one another at laſt, as, after eight or nine reflections, to dilute one another wholly, and conſtitute an even and uniform whiteneſs; whence, as well as from other experiments, it appears, that whiteneſs is certainly a mixture of all colours, and that the light which conveys it to the eye, is a mixture of rays endued with all thoſe colours.

The ſame author ſhews, that whiteneſs, if it be moſt ſtrong and luminous, is to be reckoned of the firſt order of colours; but if leſs, as a mixture of the colours of ſeveral orders. Of the former ſort, he reckons white metals; and of the latter, the whiteneſs of froth, paper, linen, and moſt other white ſubſtances. And as the white of the firſt order is the ſtrongeſt that can be made by plates of tranſparent ſubſtances, ſo it ought to be ſtronger in the denſer ſubſtances of metals, than in the rarer ones of air, water, and glaſs.

Gold, or copper, mixed either by fuſion or amalgamation, with a very little mercury, with ſilver, tin, or regulus of antimony, becomes white, which ſhews both that the particles of white metals have much more ſurface, and therefore are ſmaller than thoſe of gold and copper; and alſo, that they are ſo opake, as not to ſuffer the particles of gold or copper to ſhine through them. And as that author doubts not but that the colours of gold and copper are of the ſecond and third order, therefore the particles of white metals cannot be much bigger than is requiſite to make them reflect the white of the firſt order. See the article LIGHT.

WHITING, in ichthyology, the Engliſh name for the white gadus with no beard, with three fins on the back, and the upper jaw longeſt. See the article GADUS.

WHITING-POLLOCK, in ichthyology, a ſpecies of gadus with three back fins, the lower jaw longeſt, and the lateral line crooked. The uſual length of this fiſh is from eight to thirteen inches; it is conſiderably

ſiderably thick in proportion, and in moſt other reſpects reſembles the common whiting.

WHITES, in medicine, the ſame with fluor albus. See the article FLUOR ALBUS.

WHITLOW, in medicine. See the article PARONICHIA.

WHITSUNDAY, a ſolemn feſtival of the Chriſtian church, obſerved on the fiftieth day after Eaſter, in memory of the deſcent of the Holy Ghoſt upon the apoſtles, in the viſible appearance of fiery cloven tongues, and of thoſe miraculous powers which were then conferred upon them.

It is called Whitſunday, or White-ſunday, becauſe this being one of the ſtated times for baptiſm in the ancient church, thoſe who were baptiſed put on white garments, as types of that ſpiritual purity they received in baptiſm. As the deſcent of the Holy Ghoſt upon the apoſtles happened upon the day which the Jews called Pentecoſt, this feſtival retained the name of Pentecoſt among the Chriſtians. See the article PENTECOST.

WHOODINGS, or HOODINGS, a ſea term, uſed for planks joined and faſtened along the ſhip's ſides into the ſtem.

WHORLBAT, or HURLBAT, a kind of gauntlet, or leathern ſtrap, loaden with plummets; uſed by the ancient Romans in their ſolemn games and exerciſes, and by them called cæſtus. See the article CÆSTUS.

WHORTLE-BERRY, in botany. See the article VACCINIUM.

WIC, a place on the ſea ſhore, or on the bank of a river; though it properly ſignifies a town, village, or dwelling place; and ſometimes a machine.

WICKER, a twig of the oſier ſhrub, ſingle or wrought.

WICKET, a ſmall door in the gate of a fortified place, or a hole in a door, through which to view what paſſes without.

WICKLIFFISTS, or WICKLIFFITES, a religious ſect, which ſprunk up in England in the reign of Edward III. and took its name from John Wickliff, doctor and profeſſor of divinity in the univerſity of Oxford, who maintained that the ſubſtance of the ſacramental bread and wine remained unaltered after conſecration; and oppoſed the doctrine of purgatory, indulgences, auricular confeſſion, the invocation of ſaints, and the worſhip of images.

He maintained, that the children of the religious may be ſaved without being baptized; that prieſts may adminiſter confirmation; that there ought to be only two orders in the church, that of prieſts, and that of deacons. He made an Engliſh verſion of the Bible, and compoſed two volumes, called Alethiea, that is, Truth; from which John Huſſe learned moſt of his doctrines. In ſhort, to this reformer, we owe the firſt hint of the Reformation, which was effected about two hundred years after. See REFORMATION.

WIDOW, a woman who has loſt her huſband. In London, a freeman's widow may exerciſe her huſband's trade, as long as ſhe continues ſuch.

Marriage with a widow, in the eye of the canon law, is a kind of bigamy. See BIGAMY.

WIDOW *of the King*, was ſhe who after her huſband's death, being the king's tenant in capite, could not marry again without the king's conſent. See CAPITE.

WIFE, a married woman, or one joined with, and under the protection of, a huſband. See HUSBAND.

A wife, in our Engliſh law, is termed feme covert; and, in the judgment of the law, is reputed to have no will, as being ſuppoſed entirely under, and ſubject to, that of her huſband. See COVERTURE and BARON *and* FEME.

The wife can make no contract without the huſband's conſent; and if any goods or chattels be given her, they all immediately become her huſband's: even neceſſary apparel is not her's in property. All her perſonal chattels, which ſhe held at her marriage, are ſo much her huſband's, that after his death they ſhall not return to her, but go to the executor or adminiſtrator of her huſband, except only her paraphernalia. See PARAPHERNALIA.

The wife partakes of the honour and condition of her huſband; but none of her dignities come by marriage to her huſband; and as the law ſuppoſes the huſband to have the full power over his wife, he is obliged to anſwer for all her faults and treſpaſſes.

If a wife bring forth a child begot by a former huſband, or any other before marriage, but born after marriage with another man, this latter muſt own the child; and that child ſhall be his heir at law: and if a wife bring forth a child during her huſband's abſence, though it be of many years, yet if he lived all the time within the iſland, he muſt father the child, and the child, if firſt born, ſhall inherit.

If a wife has a jointure, and during her marriage is made pregnant by her huſband, which muſt appear by the child's being born alive, the huſband ſhall have all his wife's lands for life; but if the wife have no jointure ſettled before marriage, ſhe may, after her huſband's death, challenge the third part of his yearly rents of land, during her life. See JOINTURE.

WILDS, a term uſed by our farmers to expreſs that part of a plough by which the whole is drawn forwards.

WILDERNESS, in gardening, a kind of grove of large trees, in a ſpacious garden, in which the walks are made either to interſect each other in angles, or have the appearance of meanders and labyrinths. See GROVE and LABYRINTH.

Wilderneſſes, ſays Mr. Miller, ſhould always be proportioned to the extent of the gardens in which they are made; for it is very ridiculous to ſee a large wilderneſs planted with tall trees, in a ſmall ſpot of ground;

ground; and, on the other hand, nothing can be more abſurd, than to ſee little paultry ſquares, or quarters of wilderneſs work, in a magnificent large garden. As to the ſituation of wildernefſes, they ſhould never be placed too near the habitation, nor ſo as to obſtruct any diſtant proſpect of the country; there being nothing ſo agreeable as an unconfined proſpect; but where from the ſituation of the place, the ſight is confined within the limits of the garden, nothing can ſo agreeably terminate the proſpect, as a beautiful ſcene of the various kinds of trees judiciouſly planted; and if it is ſo contrived, that the termination is planted circularly, with the concave towards the ſight, it will have a much better effect, than if it end in ſtrait lines or angles. The plants ſhould always be adapted to the ſize of the plantation; for it is very abſurd for tall trees to be planted in the ſmall ſquares of a little garden; and in large deſigns ſmall ſhrubs will have a mean appearance. It ſhould alſo be obſerved, never to plant ever-greens amongſt deciduous trees; but always to place the evergreens in a wilderneſs in a ſeparate part by themſelves, and that chiefly in ſight.

As to the walks, thoſe that have the appearance of meanders, where the eye cannot diſcover more than twenty or thirty yards in length, are generally preferable to all others, and theſe ſhould now and then lead into an open circular piece of graſs; in the center of which may be placed either an obeliſk, ſtatue, or fountain; and, if in the middle of the wilderneſs there be contrived a large opening, in the center of which may be erected a dome or banquetting-houſe ſurrounded with a green plot of graſs, it will be a conſiderable addition to the beauty of the whole. From the ſides of the walks and openings, the trees ſhould riſe gradually one above another to the middle of the quarters, where ſhould always be planted the largeſt growing trees, ſo that the heads of all the trees may appear to view, while their ſtems will be hid from the ſight. Thus in thoſe parts which are planted with deciduous trees, roſes, honey-ſuckles, ſpiræa frutex, and other kinds of low flowering ſhrubs, may be planted next the walks and openings; and at their feet, near the ſides of the walks, may be planted primroſes, violets, daffodils, &c. not in a ſtrait line, but ſo as to appear accidental, as in a natural wood. Behind the firſt row of ſhrubs ſhould be planted ſyringas, althæa frutex, mezereons, and other flowering ſhrubs of a middle growth; and theſe may be backed with many other ſorts of trees, riſing gradually to the middle of the quarters.

The part planted with ever-greens, may be diſpoſed in the following manner, viz. in the firſt line next the great walks, may be placed the laurus-tinus, boxes, ſpurge-laurel, juniper, ſavin, and other dwarf ever-greens. Behind theſe may be placed laurels, hollies, arbutuſes, and other ever-greens of a larger growth. Next to theſe may be planted alaternuſes, phyllireas, yews, cypreſſes, Virginian cedars, and other trees of the ſame growth; behind theſe may be planted Norway and ſilver firs, the true pine, and other ſorts of the fir growth; and in the middle ſhould be planted Scotch pines, pinaſter, and other of the larger growing ever-greens, which will afford a moſt delightful proſpect, if the different ſhades of the greens are curiouſly intermixed.

But beſide the grand walks and openings (which ſhould always be laid with turf, and kept well mowed) there ſhould be ſome ſmaller ſerpentine walks through the middle of the quarters, where perſons may retire for privacy; and by the ſides of theſe private walks may alſo be ſcattered ſome wood flowers and plants, which, if artfully planted, will have a very good effect.

In the general deſign for theſe wildernefſes, there ſhould not be a ſtudied and ſtiff correſpondency between the ſeveral parts; for the greater diverſity there is in the diſtribution of theſe, the more pleaſure they will afford.

WILL, or *laſt* WILL, in law, ſignifies the declaration of a man's mind and intent relating to the diſpoſition of his lands, goods, or other eſtate, or of what he would have done after his death.

In the common law, there is a diſtinction made between a will and a teſtament; as that is called a will, where lands or tenements are given; and when the diſpoſition concerns goods and chattels alone, it is termed a teſtament. See the article TESTAMENT.

A will, though it has no force (till after the teſtator's deceaſe, does then without any other grant, or livery, &c. give and transfer eſtates, and alter the property either of lands or goods, as effectually as any deed or conveyance executed in a perſon's life-time, and thereby deſcents may be prevented, eſtates in fee, tail, for life, or for years, be made; and he that takes lands by device is in the nature of a purchaſer. Formerly a perſon could not give away by will thoſe lands that he had by deſcent, though he might ſuch as he enjoyed by way of purchaſe; but by 34 and 35 of Hen. VIII. c. 5. all perſons that have a ſole eſtate in fee ſimple of any lands, tenements, &c. may deviſe the ſame by will, at their pleaſure, to whom they think fit; and this extends to perſons ſeized in coparcenary, or as tenants in common; but lands intailed are not deviſeable, only thoſe held in fee, and goods and chattels: but wills made by infants or feme coverts, ideots, and perſons not of ſound memory, are deemed not good in law. The 29 Car. II. c. 23. has enacted, that wills and deviſes of lands, &c. ſhall be in writing, ſigned by the deviſor, or ſome other by his expreſs directions, in the preſence of at leaſt three credible witneſſes; and

and no will made in writing ſhall be revoked, but by another will, or cancelling the ſame by the teſtator himſelf, or by his direction.

In the making of a will there are theſe ſeveral rules to be obſerved, viz. 1. That it be done while the teſtator is of ſound mind and memory. 2. That there be two parts thereof, the one to remain in the hands of the party that made it; and the other in the cuſtody of ſome friend, in order to render it leſs liable to be ſuppreſſed after the teſtator's death. 3. That the whole be written in one hand writing, and, if poſſible, in one ſheet of paper or parchment. 4. In caſe there be more ſheets than one, that the teſtator ſign and ſeal every ſheet, before the witneſſes preſent at the execution.

WILL *with a wiſp*, or *Jack with a lanthorn*, a meteor known among the people under theſe names, but more uſually among authors under that of ignis fatuus. See the article METEOR.

This meteor is chiefly ſeen in ſummer nights, frequenting meadows, marſhes, and other moiſt places. It ſeems to ariſe from a viſcous exhalation, which being kindled in the air, reflects a ſort of thin flame in the dark, without any ſenſible heat.

It is often found flying along rivers, hedges, &c. by reaſon it there meets with a ſtream of air to direct it. The ignis fatuus, ſays Sir Iſaac Newton, is a vapour ſhining without heat; and there is the ſame difference berween this vapour and flame, as between rotten wood ſhining without heat, and burning coals of fire.

WILLOW, *Salix*, in botany, a genus of trees, producing male and female flowers on ſeparate plants; they are diſpoſed in oblong imbricated katkins, and are both deſtitute of petals; the male flower conſiſts of a cylindric nectarious honey gland in the center of each ſcale; the ſtamina are two ſlender erect filaments, topped with quadrilocular twin antheræ; the female flower contains an ovate narrow germen, crowned by two bifid erect ſtigmas; the fruit is an oval, awl-ſhaped, unilocular capſule, opening with two revolute valves, and containing many ſmall ovate ſeeds crowned with a hairy down.

There are various kinds of willows, ſome of which grow to the ſize of a large tree, while other ſorts are of a more humble growth; they all delight in moiſt marſhy places, and on the ſides of brooks and rivers. The propagation of willows is eaſily effected either by ſets or cuttings: thoſe ſorts which are cultivated for their timber are generally planted from branches eight or nine feet long; theſe are commonly ſharpened at their lower end, and thruſt into the ground by the ſides of ditches and banks where the ground is moiſt, in which they will freely grow. The beſt ſeaſon for planting is early in the ſpring, though they will ſucceed if planted in autumn.

Willow is of uſe to make wooden heels for ſhoes, for cricket batts, as alſo to the turners in many kinds of light wares; the loppings are uſed for ſeveral purpoſes; and the oſier which belongs to this genus is the moſt proper for making baſkets. See OZIER.

The bark, leaves, and katkins, are ſaid to be cooling and aſtringent; the leaves externally are of ſervice in baths for the feet, in order to procure ſleep, and cool the heat of fevers; the bark has the like virtues; and the aſhes thereof are reckoned effectual in extirpating warts and corns.

WIN, in the beginning or end of the names of places, ſignifies that ſome great battle was fought, or a victory gained there.

WIND, *Ventus*, in phyſiology, a ſtream of air, flowing out of one place, or region, into another. See the article AIR.

As the air is a fluid, its natural ſtate is that of reſt, which it endeavours always to keep or retrieve by an univerſal equilibrium of all its parts. When, therefore, this natural equilibrium of the atmoſphere happens by any means to be deſtroyed in any part, there neceſſarily follows a motion of all the circumjacent air towards that part to reſtore it; and this motion of the air is what we call wind.

Hence, with reſpect to that place where the equilibrium of the air is diſturbed, we ſee the wind may blow from every point of the compaſs at the ſame time; and thoſe who live Northwards of that point, have a Northwind; theſe who live Southwards, a South-wind; and ſo of the reſt: but thoſe who live on the ſpot, where all theſe winds meet and interfere, are oppreſſed with turbulent and boiſterous weather, whirl-winds, and hurricanes; with rain, tempeſt, lightening, thunder, &c. For ſulphureous exhalatione from the ſouth, torrents of nitre from the North, and aqueous vapours from every part are there confuſedly huddled, and violently blended together, and rarely fail to produce the phænomena above mentioned. See RAIN, LIGHTNING, &c.

Many are the particular cauſes which produce wind by interrupting the equipoiſe of the atmoſphere; but the moſt general cauſes are two, viz. heat, which, by rarifying the air, makes it lighter in ſome places than it is in others; and cold, which, by condenſing it, makes it heavier. Hence it is, that in all parts over the torrid zone, the air being more rarified by a greater quantity of the ſolar rays, is much lighter than in the other parts of the atmoſphere, and moſt of all over the equitorial parts of the earth. And ſince the parts at the equator are moſt rarified, which are near the ſun; and thoſe parts are, by the earth's diurnal rotation eaſtward, continually ſhifting to the weſt; it follows, that the parts of the air which lie on the weſt ſide of the point of the greateſt rarefaction, and, by flowing towards it, meet it, have leſs motion than thoſe parts on the eaſt ſide of the ſaid point, which follow it; and therefore the motion of the eaſtern air would

would prevail againſt that of the weſtern air, and ſo generate a continual eaſt-wind, if this were all the effect of that rarefaction. But we are to conſider, that as all the parts of the atmoſphere are ſo greatly rarified over the equator, and all about the poles greatly condenſed by extreme cold, this heavier air from either pole is conſtantly flowing towards the equator, to reſtore the ballance deſtroyed by the rarefaction and levity of the air over thoſe regions: hence, in this reſpect alone, a conſtant north and ſouth wind would be generated.

We find by experience, that people in general have but an obſcure idea or confuſed notion of the cauſe of this perpetual current of air from eaſt to weſt, or of a conſtant eaſt wind under the equator.

Therefore, in order to elucidate this matter, we ſhall explain it by a figure. Let C B A D E (plate XCVI. fig. 1. N° 1.) be part of a ſection of the atmoſphere over the equator, C the eaſt, E the weſt, A the point to which the ſun S is vertical, and R the point of the greateſt rarefaction, or that where the air is moſt of all heated, and conſequently, lighteſt. That this point R is on the eaſtern ſide of the point A, is not difficult to be conceived, when what is ſaid under the article TIDE, is well conſidered. And, becauſe the air at R is by ſuppoſition lighter than where it is colder at C and D, it is plain that in order to obtain an equilibrium (which is neceſſary in a fluid body) the air, by its greater weight, will have a tendency from C and D towards R, and riſe to a height there greater than at C or D, in proportion as its denſity is leſs.

Now this being the caſe, it is evident, the ſun, being always between the points R and D, will be heating the air on that part; and thoſe regions between R and C, having been deſerted by the ſun, will grow cold: conſequently, the air between C and R, as it is colder, will likewiſe be heavier than that between R and D which is hotter, and ſo will have a greater momentum, or quantity of motion, towards the point R; and ſince this point R is conſtantly moving after the point A weſtward, the motion of the weſtern air towards it, will be in part diminiſhed by that means; and being alſo inferior in quantity to the motion of the eaſtern air, the latter will prevail over it, and be conſtantly following the ſaid point R from eaſt to weſt, and thus produce a continual eaſt wind.

It may, perhaps, be here ſaid, that though the motion of the air be leſs from D to R, yet it is ſomething, and ſo there ought to be a weſtern wind, at leaſt in ſome degree, and to ſome diſtance weſtward of the point R. To which we anſwer, that the nature of a fluid will not permit two contrary motions to reſtore or ſuſtain an equilibrium (we mean in regard of the whole body of it) for wherever one part of the fluid is determined to move, all the reſt muſt neceſſarily follow it; otherwiſe the equilibrium of the air would be deſtroyed in one part to make it good in another; a defect which nature cannot be guilty of. Thus, we ſee the tides of the ocean always follow the courſe of the moon from eaſt to weſt, without any motion of the waters from the weſt towards the moon, in the open oceans; and the point R can only be conſidered as the aërial tide, or flood of high air; and has nearly the ſame phænomena with aqueous tides.

This being clearly underſtood, all the reſt is eaſy; for no one can find it difficult to conceive how the cold air from each pole muſt neceſſarily ſet in towards the equator directly, where meeting and interfering with the eaſtern current, it does with that compound a new direction for the moving air which lies between both the former, viz. a north-eaſt current on the north ſide, and a ſouth-eaſt on the ſouth ſide: all which naturally reſults from the doctrine of the compoſition of oblique forces.

And this we find to be verified in the general trade-winds, which conſtantly blow from the north-eaſt and ſouth-eaſt, to about thirty degrees on each ſide the equator, where thoſe parts are over the open ocean, and not affected with the reflection of the ſun-beams from the heated ſurface of the land; for in this caſe the wind will always ſet in upon the land, as on the coaſt of Guinea, and other parts of the torrid zone, we know it does.

Velocity and Force of the WIND. As the motion of the air has a greater or leſſer velocity, the wind is ſtronger or weaker; and it is found from obſervation, that the velocity of the wind is various, from the rate of one to fifty or ſixty miles per hour. The beſt way to prove this, is to chuſe a free open place, where the wind or current of air is not at all interrupted, but flows uniformly, or as much ſo as the undulatory ſtate of the atmoſphere will admit: in ſuch a place, a feather, or other very light body, is to be let go in the wind; and then, by a half-ſecond watch, or pendulum, you muſt obſerve nicely to what diſtance it is carried in any number of half-ſeconds, or in how many half-ſeconds it has paſſed over a given or meaſured ſpace. This will give the rate of velocity in the wind per ſecond, and of courſe per hour; which has been found, at a medium, to be twelve or fifteen miles per hour; even the moſt vehement wind does not fly above fifty or ſixty miles per hour; and ſometimes the wind is ſo ſlow, as not to exceed the velocity of a perſon riding or walking in it; and in that caſe, if the perſon goes with the wind, he finds no wind at all, becauſe there is no difference of velocity, or no relative wind, which is that only which we are ſenſible of, whilſt in motion.

The beſt method to eſtimate the force of the wind, is by means of the following anemometer. A B C D E F G H I (fig. 1. N°. 2.) is an open frame of wood, firmly ſupported by the ſhaft or poſtern I. In the croſs-pieces H K, L M, is moved an horizontal axis Q M, by means of the four ſails *a b*, *c d*,

c d, *e f*, *g h*, in a proper manner expoſed to the wind. Upon this axis is fixed a cone of wood M N O, upon which, as the ſails move round, a weight S, is raiſed by a ſtring on its ſuperficies, proceeding from the ſmall to the largeſt end N O. Upon the great end or baſe of the cone is fixed a ratchet-wheel *i k*, in whoſe teeth falls the click X, to prevent any retrograde motion from the depending weight.

From the ſtructure of this machine, it is eaſy to underſtand, that it may be accommodated to eſtimate the variable force of the wind, becauſe the force of the weight will continually increaſe, as the ſtring advances on the conical ſurface, by acting at a greater diſtance from the axis. And therefore, if ſuch a weight be put on, on the ſmalleſt part at M, as will juſt keep the machine in equilibrio with the weakeſt wind; then, as the wind becomes ſtronger, the weight will be raiſed in proportion, and the diameter of the baſe of the cone N O, may be ſo large in compariſon of that of the ſmaller end or axis at M, that the ſtrongeſt wind ſhall but juſt raiſe the weight at the great end.

Thus, for example, let the diameter of the axis be to that of the cone N O, as 1 to 28, then if S be a weight of 1 pound at M, on the axis, it will be equivalent to 28 pounds, or $\frac{1}{4}$ of an hundred, when raiſed to the greateſt end. If, therefore, when the wind is weakeſt, it ſupports 1 pound on the axis, it muſt be 28 times as ſtrong to raiſe the weight to the baſe of the cone. Thus may a line of 28 equal parts be drawn on the ſide of the cone, and the ſtrength of the wind will be indicated by that number on which the ſtring ſhall at any time hang.

The ſtring may alſo be of ſuch a ſize, and the cone of ſuch a length, that there may be ſixteen revolutions of the ſtring betwixt each diviſion of the ſcale on the cone, whence the ſtrength of the wind will be expreſſed in pounds and ounces. And if greater exactneſs be required, let the periphery of the cone's baſe be divided into 16 equal parts; then, whenever the equilibrium happens, the ſtring will leave the conic ſurface againſt one of thoſe diviſions, and thus ſhew the force of the wind to a dram avoirdupois weight.

Cardinal WINDS, are thoſe which blow from the eaſt, weſt, north, and ſouth, which are called cardinal points.

Collateral WINDS, are thoſe which blow between the cardinal points. The number of theſe is infinite, as the number of points they blow from are; a few of them only are conſidered in practice, and theſe have names compounded of the cardinal points between which they blow. See the article COMPASS.

WIND-GUN, or AIR-GUN. See the article AIR-GUN.

WIND-MILL, a kind of mill, the internal parts of which are much the ſame with thoſe of a water-mill; from which however it differs, in being moved by the impulſe of the wind upon its vanes, or ſails, which are to be conſidered as a wheel on the axle.

A deſcription of the mechaniſm of this uſeful engine, will, no doubt, be acceptable to our readers. A H O (plate XCVI. fig. 2. N°. 1.) is the upper room; H O Z, the under one; A B, the axle-tree, going quite through the mill; S T V W, the ſails, covered with canvas, ſet obliquely to the wind, and going about in the order S T V W; C D, the cog-wheel, of about 48 cogs, *a*, *a*, *a*, &c. which carries round the lantern E F, of 8 or 9 trundles *c*, *c*, *c*, &c. together with its axis G N. I K is the upper mill-ſtone; and L M, the lower one. Q R is the bridge, ſupporting the axis or ſpindle G N: this bridge is ſupported by the beams *c d*, X Y, wedged up at *c*, *d*, and X. Z Y is the lifting-tree, which ſtands upright; *a b*, *e f*, are levers, whoſe centers of motion are Z and *e*; *f g h i* is a cord, with a ſtone *i*, going about the pins *g* and *h*, and ſerving as a balance or counterpoiſe.

The ſpindle *t* N is fixed to the upper mill-ſtone I K, by a piece of iron called the rind, and fixed in the under ſide of the ſtone; which is the only one that turns about, and its whole weight reſts upon a hard ſtone, fixed in the bridge Q R, at N.

The trundle E F, and axis G *t*, may be taken away; for it fixes on the lower part at *t*, by a ſquare ſocket, and the top runs in the edge of the beam *w*. Putting down the end *f*, of the lever *f e*, raiſes *b*, which raiſes Z Y, which raiſes Y X, and this raiſes the bridge Q R, with the axis N G, and the upper ſtone I K; and thus the ſtones are ſet at any diſtance. The lower immoveable ſtone is fixed upon ſtrong beams, and is broader than the upper one. The flour is conveyed through the tunnel *n o*, down into a cheſt.

P is the hopper, into which the corn is put, which runs along the ſpout *r*, into the hole *t*, and ſo falls between the ſtones, where it is ground. The axis G *t* is ſquare, which ſhaking the ſpout *r*, as it goes round, makes the corn run out: *r s* is a ſtring going about the pin *s*, and ſerving to move the ſpout nearer or farther from the axis, ſo as to make the corn run faſter or ſlower, according to the velocity and force of the wind. And when the wind is great, the ſails S T V W are only part, or on one ſide of them, covered; or, perhaps, only a half of two oppoſite ſails.

Towards the end B, of the axle-tree, is placed another cog-wheel, trundle, and mill-ſtones, with exactly the ſame apparatus; ſo that the ſame axle-tree carries two ſtones at once: and when only one pair is to grind, the trundles E F, and axis G *t*, is taken out from the other. *x y l* is a girt of pliable wood, fixed at the end *x*; and the other end *l*, tied to the lever *k m*, moveable about *k*. And the end *m* being put down, draws the girt *x y l* cloſe to the cog-wheel; whereby the motion of the mill is ſtop-

ped at pleasure: *p q* is a ladder going into the higher part of the mill; and the corn is drawn up by means of a rope, rolled about the axis A B, when the mill is going.

In mills built of wood, the whole body of the mill turns round to the wind, on a tampin, or perpendicular post; but in those of stone, only the upper part turns in this manner. See the mill-house represented (fig. 2. N°. 2.) where 1 is the house itself, which is turned about to the wind by a man, with the help of the lever or beam 2; 3 is a roller, to hoist up the steps 4.

In those built of stone, only the roof E (fig. 2. N°. 3.) together with axis and sails A B, C D, turn round; in order to which, the roof is built turret-wise, the turret being encompassed with a wooden ring, in which is a groove, at the bottom of which a number of brass truckles are placed at certain distances; and within this groove is another ring, upon which the whole turret stands. To the upper or moveable ring are connected beams with a rope, by means of which, and a windlass below, the top of the machine, together with the sails, may be turned round, and put in the direction required.

Position of, and Force of the Wind, upon the Sails. As to the position of the sails, we must consider, that if they are placed direct to the wind, or at right angles to the axis of the mill, they will receive the whole force of the wind, which in this case will tend to blow them forward, and consequently to blow down the mill; which position of course cannot be admitted.

If the sails are set right to the wind, or parallel with the axis of the mill, it is plain, that in that position, the wind cannot act upon them at all, and therefore they cannot be turned round, nor the mill put in motion; which position of the sails must likewise be rejected.

Since neither the direct nor right position of the sails will do, an oblique position must, as there can be no other. Now, to shew that an oblique position of the sails will turn the mill, let A B (fig. 2. N°. 4.) be the axis; C D, a sail, and its angle of obliquity (viz. that which it makes with the axis) be E G C; then if G C be the force of the wind in the direct position of the sail, G E will be the force of the wind in its oblique position (as being the sign of the angle of incidence G C E). But the force G E is resolvable into two others, E F and G F; of which the latter, being parallel to the axis, avails nothing in turning the sail about it; but the other, E F, being perpendicular thereto, is wholly spent in compelling the sail to turn round: which was the thing to be shewn.

The force of the wind on the sail will be as the square of the sign of incidence, or as $\overline{GE}^2$; for the force of each single particle of air will be as the sign G E; and it will be also as the number of particles which strike at the same time, which number of particles is also as the sign of incidence G E. For let C D represent the section of the sail in a direct position, and C G the same in an oblique position, it is plain the number of particles striking it in the former case, will be to the number striking it in the latter, as C D to C F, which is equal to G E, the sine of incidence; for all the particles between A D and B F, will not come upon the sail in the oblique position C G. Since, then, the force of the wind on the sail is on two accounts as G E, it will be as the square of the said line G E.

If we suppose the velocity of the wind to vary, the force thereof will be as the square of the velocity; for the greater the velocity, the greater will be the stroke of each single particle, and also the greater will be the number of particles coming upon the sail in the same time; the force will be therefore as the squares of the velocity.

Again, if the area of the sail be variable, the force of the wind will be directly as the area or superficies of the sail; because the number of particles of the air coming upon it, will always be proportional thereto, and consequently the force with which they strike it. Hence, if A, S, and V, represent the area, sine of incidence, and velocity of the wind on one sail; and *a*, *s*, and *v*, those on another: the force compelling the former to turn round, will be to that compelling the latter, as $A \times S^2 \times V^2$ to $a \times s^2 \times v^2$.

When the area of the sail and its position in respect to the wind, continue the same, the force which turns the sails will be as the squares of the velocity; and since the wind scarce ever blows with one uniform velocity, but varies with almost every blast, the force upon the sail will be much more variable and unequal; and therefore the action or working of a wind-mill cannot be so equal, uniform, or steady, as that of a water-mill, whose power is always of the same tenor, when the jet of water is so.

If the area of the sail and the velocity of the wind be supposed constant, the force of the wind in the direct position, will be to that in the oblique one, as $\overline{GC}^2$ to $\overline{GE}^2$, as we have before shewn; and it has been also shewn, that that part of the force which turns the sail round is represented by E F, when G E is the whole force; but G E : E F (:: G C : C E) :: $\overline{GE}^2 : \frac{CE \times \overline{GE}^2}{GC}$ = to the force which turns the sail, when the whole force is represented by $\overline{GE}^2$, as is here the proper expression of it.

This expression $\frac{CE \times \overline{GE}^2}{GC}$ begins from nothing, when the angle of incidence begins to be oblique, and increases with the obliquity of the said angle to a certain number of degrees; because that part of the force which is parallel to the axis, becomes lesser in proportion to that which is perpendicular to it: but

but after it has paſſed this limit, it again decreaſes, and becomes nothing, when the angle of incidence vaniſhes; as is eaſy to underſtand, by conſidering that the quantity of wind on the ſail does in this caſe continually decreaſe.

There is therefore one certain poſition of the ſail, in which the force of the wind is greateſt of all upon it, or a maximum; and to find it, put radius GC $= a$, EC $= x$, and we have $\overline{GE}^2 = aa - xx$; and, conſequently, the force $\frac{CE \times \overline{GE}^2}{GC} = \frac{aax - xxx}{a}$, which muſt be a maximum: therefore, its fluxion $aa\dot{x} - 3xx\dot{x} = 0$; whence $aa = 3xx$, and ſo $x = \sqrt{\frac{aa}{3}}$; which in logarithms is $\frac{20,000000 - 0,477121}{2} 9,761439$, which is the logarithm ſine of the angle 35° 16′ = the angle CGE; and therefore the angle ECG is equal to 54° 44′, when the force of the wind is a maximum, as required.

The angle now found, is only that which gives the wind the greateſt force to put the ſail in motion, but not the angle which gives the force of the wind a maximum upon the ſail when in motion. What this angle is, Mr. Mac Laurin has ſhewn in his book of Fluxions, to which we refer the reader.

Mr. Parent has alſo ſhewn, that an elliptic form of the ſails is better than a parallelogram, or long ſquare; and that the beſt poſition of the ſail is not that which is common, viz. with its longeſt ſide or diameter parallel to the axis of the ſail; but, on the contrary, it ought to be perpendicular to it; that is, they ought to be of ſuch a form, and placed in ſuch a manner, as repreſented fig. 2. N°. 5. And after the four ſails B, C, D, E, are thus placed on the axis or arm A, they are then to be turned about, and fixed under the proper angle of obliquity above mentioned.

There are three things yet wanting to the perfection of a wind-mill. 1. Some contrivance in the nature of a fly, to regulate the motion of the train, under the unequal and irregular impulſe of the wind. 2. Some other contrivance to ſupply the hopper, or ſtones, with more or leſs corn, in proportion to the greater or leſs ſtrength of the wind. 3. A method of altering the angle of the ſail's obliquity, from its maximum of 54° 44′, at the beginning of the motion, to its minimum, when in motion.

WIND, in the manege. A horſe that carries in the wind, is one that toſſes his noſe as high as his ears, and does not carry handſomely. The difference between carrying in the wind, and beating upon the hand, is, that the horſe who beats upon the hand, ſhakes his head, and reſiſts the bridle; but he who carries in the wind, put up his head without ſhaking, and only ſometimes beats upon the hand. The oppoſite to carrying in the wind, is arming and carrying low.

WIND-FLOWER, *Anemone*, in botany. See the article ANEMONE.

WIND-GALL, a name given by our farriers to a diſtemperature of horſes. In this caſe there are bladders full of a corrupt jelly, which, when let out, is thick, and of the colour of the yolk of an egg. They vary in ſize, but are more uſually ſmall than large. Their place is about the fetlock-joint, and they grow indifferently on all four legs, and are often ſo painful, eſpecially in the ſummer ſeaſon, when the weather is hot, and the ground dry and hard, that they make the creature frequently ſtumble, or even fall down. The general method of cure is to open the ſwelling, about the length of a bean, and to preſs out the jelly: when this is done, they apply a mixture of the oil of bays, and the white of an egg, covering it with tow. Another method is, after the jelly is all ſqueezed out, to wrap round the part a wet woollen-cloth, and then applying a taylor's hot iron, this is to be rubbed over till the moiſture is carried away; it is then to be doubed all over with pitch, maſtich, and reſin, boiled together, laying tow in plenty over all. The wind-galls that are ſituated near the ſinews, are much the moſt painful of all, and ſooneſt make the horſe lame.

The general cauſe of wind-galls is ſuppoſed to be extreme work or exerciſe in hot weather; but it is to be obſerved, that thoſe horſes which have long joints, will be wind-galled if they work never ſo little. The worſt wind-galls are thoſe of the hinder legs; all the above-mentioned methods will frequently miſs of ſucceſs in theſe, and nothing but fire will cure them.

WIND-HATCH, in mining, a term uſed to expreſs the place at which the ore is taken out of the mines.

WIND-SHOCK, a name given by our farmers to a diſtemperature to which fruit-trees, and ſometimes timber-trees, are ſubject.

Mortimer is of opinion, that the wind ſhock is a ſort of bruiſe and ſhiver throughout the whole ſubſtance of the tree; but that the bark being often not affected by it, it is not ſeen on the outſide, while the inſide is twiſted round, and greatly injured.

It is by ſome ſuppoſed to be occaſioned by high winds; but others attribute it to lightning. Thoſe trees are moſt uſually affected by it, whoſe boughs grow more out on one ſide than on the other.

The beſt way of preventing this in valuable trees, is to take care, in the plantation, that they are ſheltered well, and to cut them frequently in a regular manner, while young. The winds not only twiſt trees in this manner, but they often throw them wholly down; in this caſe the common method is to cut up the tree for firing, or other uſes; but if it be a tree that is worth preſerving, and it be not broken, but only torn up by the roots, it may be proper to raiſe it again, by the following method: let

let a hole be dug deep enough to receive its roots, in the place where they before were: let the ſtraggling roots be cut off, and ſome of the branches, and part of the head of the tree: then let it be raiſed; and when the torn-up roots are replaced in the earth, in their natural ſituation, let them be well covered, and the hole filled up with rammed earth; the tree will, in this caſe, grow well, and perhaps better, than before. If nature be left to herſelf, and the tree be not very large, the pulling off the roots will raiſe it.

Whirl-WIND. See WHIRL-WIND.

WINDAGE *of a Gun*, the difference between the diameter of the bore, and the diameter of the ball.

WINDLASS, or WINDLACE, a machine uſed to raiſe huge weights withal, as guns, ſtones, anchors, &c.

It is very ſimple, conſiſting only of an axis, or roller, ſupported horizontally at the two ends, by two pieces of wood and a pulley: the two pieces of wood meet at top, being placed diagonally, ſo as to prop each other; the axis, or roller, goes through the two pieces, and turns in them. The pully is faſtened at top where the pieces join. Laſtly, there are two ſtaves or handſpikes go through the roller, whereby it is turned, and the rope which comes over the pulley is wound off and on the ſame.

WINDOW, q. d. wind-door, an aperture or open place in the wall of a houſe, to let in the wind and light. See the article HOUSE.

We have various forms of windows, as, arched windows, circular windows, elliptical windows, ſquare and flat windows, round windows, oval windows, Gothic windows, regular windows, ruſtic windows, and ſky-lights.

The chief rules in regard to windows are, 1. That they be as few in number, and as moderate in dimenſions, as may conſiſt with other due reſpects; inaſmuch as all openings are weakenings. 2. That they be placed at a convenient diſtance from the angles, or corners of the building; becauſe that part ought not to be enfeebled, whoſe office is to ſupport and faſten all the reſt of the building. 3. That care be taken that the windows are all equal one with another, in their rank and order; ſo that thoſe on the right hand may anſwer to thoſe on the left, and thoſe above be right over theſe below; for this ſituation of windows will not only be handſome and uniform, but alſo the void being upon the void, and the full upon the full, it will be a great ſtrengthening to the whole fabric.

As to their dimenſions, care is to be taken not to give them more or leſs light than is needful; that is, to make them no bigger, nor leſs, than is convenient; therefore, regard is to be had to the bigneſs of the rooms which are to receive the light: it is evident, that a great room needs more light, and, conſequently, a greater window than a little room. The apertures of windows, in middle-ſized houſes, may be four and a half, or five feet, between the jaumbs, and in greater buildings ſix and a half, or ſeven feet, and their height may be double their length at the leaſt. But in high rooms, or large buildings, their height may be a third, a fourth, or half a breadth more than double their length. Theſe are the proportions of the windows for the firſt ſtory; and according to theſe muſt the upper ſtories be for breadth; but, as for height, they muſt diminiſh: the ſecond ſtory may be one-third part lower than the firſt, and the third one-fourth part lower than the ſecond.

WINE, *Vinum*, a briſk, agreeable, ſpirituous, and cordial liquor, drawn from vegetable bodies and fermented. See FERMENTATION.

The character of a wine, according to Boerhaave, is, that the firſt thing it affords by diſtillation, be a thin, oily, inflammable fluid, called a ſpirit.

This diſtinguiſhes wines from another claſs of fermented vegetable juices, viz. vinegar, which inſtead of ſuch ſpirit, yields, for the firſt thing, an acid uninflammable matter.

All ſorts of vegetables, fruits, ſeeds, roots, &c. afford wine; as grapes, currants, mulberries, elderberries, cherries, apples, pulſe, beans, peas, turneps, radiſhes, and even graſs itſelf. Hence, under the claſs of wines, or vinous liquors, come not only wines abſolutely ſo called, but ale, cyder, &c. See VINEGAR.

WINE, is, in a more peculiar manner, appropriated to that which is drawn from the fruit of the vine, by ſtamping its grapes in a vat, or cruſhing and expreſſing the juice out of them in a preſs, and then fermenting them, &c.

The goodneſs of wine conſiſts in its being neat, dry, fine, bright, and briſk, without any taſte of the ſoil, of a clean ſteady colour, having a ſtrength without being heady, a body without being ſour, and keeping without growing hard or eager. The difference of flavour, taſte, colour, and body, in wines, is, perhaps, as much owing to the different manner and time of preſſing, gathering, and fermenting the grape, as to any difference of the grape itſelf.

In Hungary, whence tockay and ſome of the richeſt and higheſt-flavoured wines come, they are extremely curious in theſe reſpects: for their prime and moſt delicate wines, the grape is ſuffered to continue upon the vine, till it is half dried by the heat of the ſun; and, if the ſun's heat ſhould not prove ſufficient, they are dried by the gentle heat of a furnace, and then picked one by one from the ſtalks; the juice of this grape, when preſſed out, is of a fine flavour, and ſweet as ſugar: this, after due fermentation, is kept for a year, and then racked from the leys, when it proves a generous, oily, rich wine, and is ſold at a very high rate.

The Hungarians prepare a ſecond ſort of wine, by

by collecting together the better kind of grapes, carefully picking the fruit from the ſtalks, and then preſſing out the juice: this is extremely ſweet, and is made richer by infuſing in it, after it has fermented for ſome days, a ſufficient quantity of half-dried grapes. This wine, beſides being very ſweet, is oily, and of a grateful taſte, and retains theſe qualities for a long time.

There is a third ſort, made from the pure juice of this kind of grape, without any addition. This is a more briſk and lively wine, and far leſs ſweet.

They likewiſe prepare a fourth ſort, from grapes of different goodneſs mixed together; this, though not ſo generous, is nevertheleſs an excellent wine.

Theſe Hungarian wines are remarkable for preſerving their ſweetneſs, and for the delicacy of their taſte and ſmell; they, likewiſe, do not grow eaſily vapid, and may be kept in perfection for many years.

Wine being a liquor moſtly of foreign produce, the divers names, forms, kinds, diſtinctions, &c. thereof, are borrowed from the countries where it is produced; the principal whereof, at this day, is France, to wines of which country, a good part of what we have to ſay of this noble liquor, will more immediately belong.

Wine in France is diſtinguiſhed from the ſeveral degrees and ſteps of its preparation, into, 1. *Mere goutte*, mother-drop, which is the virgin wine, or that which runs of itſelf out at the top of the vat wherein the grapes are laid, before the vintager enters to tread or ſtamp the grapes. 2. Muſt, ſurmuſt, or ſtum, which is the wine or liquor in the vat, after the grapes have been trod or ſtamped. 3. Preſſed wine, being that ſqueezed with a preſs out of the grapes half bruiſed by the treading. The huſks left of the grapes are called rope, murk, or mark, by throwing water upon which, and preſſing them afreſh, they make a liquor for ſervants uſe, anſwerable to our cyderkin, and called *boiſſon*, which is of ſome uſe in medicine, in the cure of diſorders occaſioned by viſcid humours.

4. Sweet wine, is that which has not yet worked nor fermented. 5. Bouru, that which has been prevented working by caſting in cold water. 6. Worked wine, that which has been let work in the vat, to give it a colour. 7. Boiled wine, that which has had a boiling before it worked, and which by that means ſtill retains its native ſweetneſs. 8. Strained wine, that made by ſteeping dry grapes in water, and letting it ferment of itſelf.

Wines are alſo diſtinguiſhed with regard to their colour, into white wine, red wine, claret wine, pale wine, roſe or black wine; and with regard to their country, or the ſoil that produces them, into French wines, Spaniſh wines, Rheniſh wines, Hungary wines, Greek wines, Canary wines, &c. and more particularly into Port wine, Madeira wine, &c:

Method of making, fining, &c. WINE. In the Southern parts of France, their way is with red wines to tread or ſqueeze the grapes between the hands, and to let the whole ſtand, juice and huſks, till the tincture be to their liking; after which they preſs it. But for white wines, they preſs the grapes immediately; when preſſed they tun the muſt and ſtop up the veſſel, only leaving the depth of a foot or more to give room for it to work. At the end of ten days they fill this ſpace with ſome other proper wine, that will not provoke it to work again. This they repeat from time to time, new wine ſpending itſelf a little before it comes to perfection.

The uſual method of fining down wines, ſo as to render them expeditiouſly bright, clear and fit for uſe, is this. Take an ounce of iſinglaſs, beat it into thin ſhreads with a hammer, and diſſolve it, by boiling, in a pint of water; this when cold becomes a ſtiff jelly. Whiſk up ſome of this jelly into a froth with a little of the wine intended to be fined, then ſtir it well among the reſt in the caſk, and bung it down tight; by this means the wine will become bright in eight or ten days.

This method, however, is found to be beſt ſuited to the white wines; for the red ones, the wine-coopers commonly uſe the whites of eggs beat up to a froth, and mixed in the ſame manner with their wines.

They fine it down alſo by putting the ſhavings of green beech into the veſſel, having firſt taken off all the rind, and boiled them an hour in water to extract their rankneſs, and afterwards dried them in the ſun, or in an oven. A buſhel of theſe ſerve for a tun of wine: and being maſhed, they ſerve again and again, till almoſt quite conſumed.

For Engliſh wine the method recommended by Mortimer, is firſt to gather the grapes when very dry, to pick them from the ſtalks, then to preſs them, and let the juice ſtand twenty-four hours in a vat covered. Afterwards to draw it off from the groſs lees, and then put it up in a caſk, and to add a pint or quart of ſtrong red or white port to every gallon of juice, and let the whole work, bunging it up cloſe, and letting it ſtand till January; then bottle it in dry whether. Bradley chuſes to have the liquor, when preſſed, ſtand with the huſks, ſtalks, and all in the vat, to ferment for fifteen days.

The method of converting white-wine into red, ſo much practiſed by the modern wine coopers, Dr. Shaw obſerves is this. Put four ounces of turneſole rags into an earthen veſſel, and pour upon them a pint of boiling water; cover the veſſel cloſe, and leave it to cool; ſtrain off the liquor, which will be of a fine deep red, inclining to purple. A ſmall portion of this colours a large quantity of wine. This tincture might be either made in brandy, or mixed with it, or elſe made into a ſyrup, with ſugar-

gar, for keeping. A common way with the wine-coopers is to infuse the rags cold in wine for a night or more, and then wring them out with their hands; but the inconveniency of this method is, that it gives the wine a disagreeable taste; or what is commonly called the taste of the rag; whence the wines thus coloured, usually pass among judges for pressed wines, which have all this taste from the canvas rags in which the lees are pressed.

The way of extracting the tincture, as here directed, is not attended with this inconvenience; but it loads the wine with water; and if made into a syrup, or mixed in brandy, it would load the wine with things not wanted, since the colour alone is required. Hence the colouring of wines has always its inconveniencies.

In those countries which do not produce the tinging grape, which affords a blood-red juice, wherewith the wines of France are often stained, in defect of this, the juice of elder-berries is used, and sometimes logwood is used at Oporto.

The colour afforded by the method here proposed, gives wine the tinge of the Bourdeaux-red, not the port; whence the foreign coopers are often distressed for want of a proper colouring for red wines in bad years. This might perhaps be supplied by an extract made by boiling stick-lack in water. The skins of tinging grapes might also be used, and the matter of the turnesole procured in a solid form, not imbibed in rags.

Stahl observes, that it is a common accident, and a disease in wines, to be kept too hot; which is not easy to cure when it has been of any long continuance, otherwise it may be cured by introducing a small artificial fermentation, that new ranges the parts of the wine, or rather recovers their former texture: but the actual exposing of wine to the fire, or the sun, presently disposes it to turn eager; and the making it boiling hot, is one of the quickest ways of expediting the process of making of vinegar.

On the other hand, wine kept in a cool vault, and well secured from the external air, will preserve its texture intire in all the constituent parts, and sufficiently strong for many years, as appears not only from old wines, but other foreign fermented liquors, particularly those of China, prepared from a decoction of rice, which being well closed down in a vessel, and buried deep under ground, will continue for a long series of years, rich, generous, and good, as the histories of that country universally agree in assuring us.

The most general remedy hitherto known for all the diseases of wines, is a prudent use of tartarized spirit of wine, which not only enriches but disposes all ordinary wines to grow fine.

If either by fraud or accident a larger portion of water is mixed with wine than is proper for its consistence, and no way necessary or essential, this superfluous water does not only deprave the taste, and spoil the excellence of the wine, but also renders it less durable; for humidity in general, and much more a superfluous aqueous humidity, is the primary and restless instrument of all the changes that are brought on by fermentation. It may doubtless, therefore be useful, and sometimes absolutely necessary, to take away this superfluous water from the other part which strictly and properly constitutes the wine. This has been agreed upon on all hands as a thing proper; but the manner of doing it has not been well agreed on; some have proposed the effecting it by means of heat and evaporation, others by percolation, and others by various other methods, all found unsuccessful when brought to the trial; but the way proposed by Dr. Shaw from Stahl, is the most certain and commodious; this is done by a concentration of the wine, not by means of heat, but of cold.

If any kind of wine, but particularly such as has never been adulterated, be in a sufficient quantity, as that of a gallon or more, exposed to a sufficient degree of cold in frosty weather, or be put into any place where ice continues all the year, as in our ice-houses, and there suffered to freeze, the superfluous water that was originally contained in the wine, will be frozen into ice, and will leave the proper and truly essential part of the wine unfrozen, unless the degree of cold should be very intense, or the wine but weak and poor. This is the principle on which Stahl founds his whole system of condensing wines by cold. When the frost is moderate, the experiment has no difficulty, because not above a third or fourth part of the superfluous water will be froze in a whole night; but if the cold be very intense, the best way is, at the end of a few hours, when a tolerable quantity of ice is formed, to pour out the remaining fluid liquor, and set it in another vessel to freeze again by itself.

If the vessel, that thus by degrees receives the several parcels of the condensed wine, be suffered to stand in the cold freezing place, where the operation is performed, the quantity lying thin in the pouring out, or otherwise, will be very apt to freeze anew; and if it be set in a warm place, some of this aqueous part thaws again, and so weakens the rest. The condensed wine, therefore, should be emptied in some place of a moderate degree as to cold or heat, where neither the ice may dissolve nor the vinous substance mixed among it be congealed. But the best expedient of all is to perform the operation with a large quantity of wine, or that of several gallons, where the utmost exactness, or the danger of a trifling waste, need not be regarded.

By this method, when properly performed, there first freezes about one third part of the whole liquor; and this is properly the more purely aqueous part of it, insomuch that when all the vinous fluid is poured off, to be again exposed to a concentration, the ice

remaining behind, from this firſt freezing, being ſet to thaw in a warm place, diſſolves into a pure and taſteleſs water. The frozen part, or ice, conſiſts only of the watery part of the wine, and may be thrown away, and the liquid part retains all the ſtrength, and is to be preſerved. This will never grow ſour, muſty, or mouldy afterwards, and may at any time be reduced to wine of the common kind again, by adding to it as much water as will make it up to the quantity that it was before.

Wines in general may by this method be reduced to any degree of vinoſity or perfection.

The benefit and advantage of this method of congelation, if reduced to practice in the large way, in the wine countries, muſt be evident to every body. Concentrated wines, in this manner, might be ſent into foreign countries, inſtead of wine and water, which is uſually now ſent; the wines they export being loaded, and in danger of being ſpoiled, by three or four times their own quantity of unneceſſary, ſuperfluous, and prejudicial water.

An eaſy method of recovering pricked wines, may be learned from the following experiment: take a bottle of red-port that is pricked, add to it half an ounce of tartarized ſpirit of wine, ſhake the liquor well together, and ſet it by for a few days, and it will be found very remarkably altered for the better.

This experiment depends upon the uſeful doctrine of acids and alkalies. All perfect wines have naturally ſome acidity, and when this acidity prevails too much, the wine is ſaid to be pricked; which is truly a ſtate of the wine tending to vinegar: but the introduction of a fine alkaline ſalt, ſuch as that of tartar, imbibed by ſpirit of wine, has a direct power of taking off the acidity; and the ſpirit of wine alſo contributes to this, as a great preſervative in general of wines. If this operation be dexterouſly performed, pricked wines may be abſolutely recovered by it, and remain ſaleable for ſome time: and the ſame method may be uſed to malt liquors juſt turned ſour.

The age of wine is properly reckoned by leaves; thus they ſay wine of two, four, or ſix leaves, to ſignify wine of two, four, or ſix years old; taking each new leaf put forth by the vine, ſince the wine was made, for a year.

WINE is alſo a denomination applied in medicine and pharmacy to divers mixtures and compoſitions wherein the juice of the grape is a principal ingredient.

With regard to the medical uſes of wines, it is obſerved, that among the great variety of wines in common uſe among us, five are employed in the ſhops as menſtrua for medicinal ſimples: that is, the vinum album Hiſpanicum, or mountain wine; the vinum album Gallicum, or French white wine; the Canary wine, or ſack; the Rheniſh wine; and the red port.

The effects of theſe liquors on the human body, are to chear the ſpirits, warm the habit, promote perſpiration, render the veſſels full and turgid, raiſe the pulſe, and quicken the circulation. The effects of the full-bodied wines are much more durable than thoſe of the thinner; all ſweet wines, as Canary, abound with a glutinous, nutritious ſubſtance, whilſt the others are not nutrimental, or only accidentally ſo, by ſtrengthening the organs employed in digeſtion. Sweet wines, in general, do not paſs off freely by urine; and they heat the conſtitution more than an equal quantity of any other, though containing full as much ſpirit; red port, and moſt of the red wines, have an aſtringent quality, by which they ſtrengthen the tone of the ſtomach, and thus prove ſerviceable for reſtraining immoderate ſecretions; thoſe which are of an acid nature, as rheniſh, paſs freely by the kidnies, and gently looſen the belly. It is ſuppoſed that theſe laſt exaſperate and occaſion gouty calculous diſorders, and that new wines of every kind have this effect.

WINE-SPIRIT, a term uſed by our diſtillers, and which they ſeem to mean the ſame thing with the phraſe of ſpirit of wine; but they are taken in very different ſenſes in the trade.

Spirit of wine is the name given to the common malt-ſpirit, when reduced to an alcohol, or totally inflammable ſtate; but the phraſe wine-ſpirit is uſed to expreſs a very clean and fine ſpirit, of the ordinary proof ſtrength, and made in England from wines of foreign growth.

The way of producing it is by ſimple diſtillation, and it is never rectified any higher than common bubble proof. The ſeveral wines of different natures, yield very different proportions of ſpirit; but, in general, the ſtrongeſt yield one-fourth, the weakeſt in ſpirits one-eighth part of proof-ſpirit; that is, they contain from a ſixteenth to an eighth part of their quantity of pure alcohol.

Wines that are a little ſour, ſerve not at all the worſe for the purpoſes of the diſtiller, they rather give a greater vinoſity to the produce. This vinoſity is a thing of great uſe in the wine-ſpirit, whoſe principal uſe is to mix with another that is tartarized, or with a malt-ſpirit, rendered alkaline by the common method of rectification. All the wine-ſpirits made in England, even thoſe from the French wines, appear very greatly different from the common French brandy; and this has given our diſtillers a notion that there is ſome ſecret art practiſed in France, for the giving the agreeable flavour to that ſpirit; but this is without foundation.

WING, *Ala*, that part of a bird, inſect, &c. whereby it is enabled to fly.

Willoughby obſerves, that all birds whatſoever have wings, or rudiments of wings, which anſwer to the fore legs in quadrupeds. Among land-fowl he obſerves, that the oſtrich, caſſowary, and dodo;

and among water-fowl, the pengune, have wings altogether uſeleſs and unfit for flight.

Inſects, indeed, have wings, and ſo have bats, but of a different kind from thoſe of birds; the former being membranaceous, and the latter cutaneous: birds only have wings made up of feathers. All birds, towards the extremity of their wings, have a certain finger-like appendix, which is commonly called the ſecundary or baſtard-wing. It is made up of four or five ſmall feathers. Beſides this under the wing, or on the inſide of the wing, ſome birds, eſpecially water-fowl, have a row of feathers growing, called interior baſtard wing, which in moſt birds is of a white colour.

Reumur obſerves, that wings among the fly-claſs, afford ſeveral ſubordinate diſtinctions of the genera of thoſe animals, under the ancient general claſſes. Several ſpecies of flies, while they are in a ſtate of reſt, or only walking, ſhew ſeveral regularly diſtinct manners of carrying their wings. The much greater number, however, carry them in a parallel or plain poſition. Among thoſe who carry them thus, ſome have them in form of a ſort of oars, their direction being perpendicular to the length of the body, which is not at all covered by them. Others carry their wings in this manner, ſo as that they cover a part of the body, without at all covering one another. The wings of others croſs one another on the body of the creature, and the degrees in which they cover one another, give occaſion to ſeveral other ſub-diſtinctions; for ſome of them over-hang on each ſide the body of the animal, while others croſs one another, in ſuch a manner, as not to cover the body of the fly entirely, but leave a rim of it viſible and uncovered on each ſide of them.

Some of the flies bred of water-worms, have their wings in this manner. Others have their wings thus diſpoſed, but croſſing one another only in a part of their ſurface, and that at their extremities; ſo that though they there cover the body of the fly, they leave a portion of the anterior part of the body naked. See the article FLY.

The beautiful wings of butterflies are diſtinguiſhed from thoſe of the fly-kind, by their not being thin and tranſparent, like them, but thicker and opake. This opacity in them is only owing to the duſt which comes off them, and ſticks to the fingers in handling them; and it is alſo to this duſt that they owe all their beautiful variety of colours. The earlier naturaliſts, for this reaſon, diſtinguiſhed theſe inſects by the appellation of ſuch as had farinaceous wings.

The wings of gnats are of a very curious ſtructure, and well worthy the uſe of the microſcope, to ſee them diſtinctly. It is well known, that on touching the wings of butterflies, a coloured powder is left on the finger, which, though to the naked eye it appears a mere ſhapeleſs duſt, yet when examined by the microſcope, it is found to be very regularly figured beautiful bodies, in form of feathers and ſcales: theſe are of various figures, and all of them very elegant. The generality of flies have nothing of this kind; but the cloſe examination of the wings of the gnat will ſhew, that they are not wholly diſtitute of them: they are much more ſparingly beſtowed, indeed, upon the gnat than on the butterfly; but then they are arranged with greater regularity.

WINGS, in heraldry, are borne ſometimes ſingle, ſometimes in pairs; in which caſe they are called conjoined. When the points are downward, they are ſaid to be inverted; when up, elevated.

WING, in botany, the angle formed between the ſtem and the leaves, or pedicles of the leaves of a plant.

WINGS, in military affairs, are the two flanks or extremes of an army, ranged in form of a battle; being the right and left ſides thereof.

WINGS, in fortification, denote the longer ſides of horn-works, crown-works, tenailles, and the like out-works; including the ramparts and parapets, with which they are bounded on the right and left from their gorge to their front.

WINGED-LEAVES, in botany, are thoſe which are compoſed of ſeveral folioli, or little leaves, ranged on each ſide the common footſtalk like wings; but as theſe are diſpoſed in different forms, ſo they have different appellations. See the articles PINNATE.

WINGED-SEEDS, are thoſe which are furniſhed with down or hairs, by the help of which they are buoyed up in the air, and carried a conſiderable diſtance; ſuch are thoſe of the dandelion, ſowthiſtle, &c.

WINNOW, ſignifies to fan or ſeparate corn from the chaff by the wind.

WINTER, one of the four ſeaſons or quarters of the year.

Winter commences on the day when the ſun's diſtance from the zenith of the place is greateſt, and ends on the day when its diſtance is at a mean between the greateſt and leaſt.

Notwithſtanding the coldneſs of the ſeaſon, it is proved by aſtronomers, that the ſun is really nearer the earth in winter than in ſummer.

Under the equator, the winter as well as other ſeaſons, return twice every year; but all other places have only one winter in the year, which in the northern hemiſphere begins when the ſun is in the tropic of Capricorn, and in the ſouthern hemiſphere when in the tropic of Cancer; ſo that all places in the ſame hemiſphere have their winter at the ſame time.

WINTER, among printers, that part of the printing preſs ſerving to ſuſtain the carriage.

WINTER's BARK, *Cortex Winteranus*, in botany, a name given to the bark of the white or wild cinnamon tree.

The winter's bark is a thick and firm bark, tho' we have a different thing ſometimes under its name: it comes to us rolled up in the manner of the common cinnamon, into a kind of tubes or pipes; but they are uſually thicker, and always ſhorter than the fine tubes of cinnamon. It is externally of a greyiſh colour, and of a reddiſh brown within; it is properly indeed a double bark, the outer and inner of the ſame tree, not the inner bark alone, ſeparated from the other, as the cinnamon and caſſia are. The outer rind is of an uneven ſurface and of a looſe texture, very brittle, and eaſily powdered. The inner bark, which has the principal virtue, is hard, and of a duſky reddiſh brown. The outer one is often cracked and open in ſeveral places, the inner one never in any. It is of an extremely fragrant and aromatic ſmell, and of a ſharp, pungent, and aromatic taſte, much hotter than cinnamon in the mouth, and leaving a more laſting flavour on it.

It is to be choſen in pieces not too large, with the inner or brown part ſound and firm, and of a very ſharp taſte. It is apt to be worm eaten; but in that caſe it is wholly to be rejected, as having loſt the far greater part of its virtue.

The cortex Winteranus was wholly unknown to the ancients; the diſcovery of it among us is owing to captain Winter, who, in the year 1567, going as far as the Straights of Magellan with Sir Francis Drake, found this bark on that coaſt, and bringing a large quantity of it with him in his return to England, it became uſed in medicine, and was ever after called by his name. It is not, however, peculiar to the place he found it in, but is frequent in many parts of America.

The virtues of this bark were diſcovered by the Engliſh ſailors on board captain Winter's ſhip; they firſt uſed it by way of ſpice to their foods, and afterwards for the ſcurvy. It is alſo good in palſies and rheumatiſms; and a decoction of the leaves is good, by way of fomentation, for the parts externally affected by the ſcurvy. The Engliſh ſailors made it famous for its virtues againſt the poiſon of a certain fiſh, common about the Magellanic ſea, which they called the ſea-lion: they eat the fleſh of this fiſh, and fell into many illneſſes by it; among which was one attended with a peeling off the ſkin of their whole bodies, not without exceſſive pain; this they remedied by the cortex Winteranus: but by the accounts we have of the effects of eating this fiſh, as it is called, they were rather ſymptoms of an inveterate ſcurvy, and, therefore, it is no wonder this bark did them great ſervice.

WINTER-QUARTERS. See the article QUARTERS.

WINTER-RIG, among huſbandmen, ſignifies to fallow or till the land in winter.

WINTER-SOLSTICE. See the article SOLSTICE.

WINTERANA, in botany, a genus of plants, whoſe flower conſiſts of five oblong ſeſſile petals, with a conic, concave, pitcher-ſhaped nectarium: the ſtamina hath no filaments, but conſiſts of ſixteen linear antheræ: the fruit is a roundiſh berry with three cells, each containing two heart-ſhaped ſeeds.

WIRE, a piece of metal drawn through the hole of an iron into a thread, of a fineneſs anſwerable to the hole it paſſed through.

Wires are frequently drawn ſo fine, as to be wrought along with other threads of ſilk, wool, flax, &c.

The metals moſt commonly drawn into wire, are gold, ſilver, copper, and iron. Gold wire is made of cylindrical ingots of ſilver, covered over with a ſkin of gold, and thus drawn ſucceſſively through a vaſt number of holes, each ſmaller and ſmaller; till at laſt it is brought to a fineneſs exceeding that of a hair. That admirable ductility which makes one of the diſtinguiſhing characters of gold, is no where more conſpicuous, than in this gilt wire. A cylinder of forty-eight ounces of ſilver, covered with a coat of gold, only weighing one ounce, as Dr. Halley informs us, is uſually drawn into a wire, two yards of which weigh no more than one grain; whence ninety-eight yards of the wire weigh no more than forty-nine grains, and one ſingle grain of gold covers the ninety-eight yards; ſo that the thouſandth part of a grain is above one-eighth of an inch long. The ſame author, computing the thickneſs of the ſkin of gold, found it to be $\frac{1}{134500}$ part of an inch. Yet ſo perfectly does it cover the ſilver, that even a microſcope does not diſcover any appearance of the ſilver underneath. M. Rohault likewiſe obſerves, that a like cylinder of ſilver, covered with gold, two feet eight inches long, and two inches nine lines in circumference, is drawn into a wire 307200 feet long i. e. into 115200 times its former length. Mr. Boyle relates, that eight grains of gold, covering a cylinder of ſilver, is commonly drawn into a wire 13000 feet long. See the articles GOLD and DUCTILITY.

Silver-wire is the ſame with gold-wire, except that the latter is gilt, or covered with gold, and the other is not.

There are alſo counterfeit gold and ſilver-wires; the firſt made of a cylinder of copper, ſilvered over, and then covered with gold; and the ſecond of a like cylinder of copper, ſilvered over, and drawn through the iron, after the ſame manner as gold and ſilver-wire.

Braſs-wire is drawn after the ſame manner as the former. Of this there are divers ſizes, ſuited to the different

different kinds of works. The fineſt is uſed for the ſtrings of muſical inſtruments, as ſpinets, harpſichords, manichords, &c. See the article SPINET, &c,

The pin-makers, likewiſe, uſe vaſt quantities of braſs-wire, to make their pins of. Iron-wire is drawn of various ſizes, from half an inch to one-tenth of an inch diameter.

The firſt iron that runs from the ſtone, when melting, being the ſofteſt and tougheſt, is preſerved to make wire of. Iron-wire is made from ſmall bars of iron, called eſleom-iron, which are firſt drawn out to a greater length, and to about the thickneſs of one's little finger, at a furnace, with a hammer gently moved by water. Theſe thinner pieces are bored round, and put into a furnace to aneal for twelve hours. A pretty ſtrong fire is uſed for this operation. After this they are laid under water for three or four months, the longer the better; then they are delivered to the workmen, called rippers, who draw them into wires through two or three holes. After this they aneal them again for ſix hours, and water them a ſecond time for about a week, and they are then delivered again to the rippers, who draw them into wire of the thickneſs of a large packthread. They are then anealed a third time, and then watered for a week longer, and delivered to the ſmall wire-drawers, called over-houſe-men.

In the mill where this work is performed, there are ſeveral barrels hooped with iron, which have two hoops on their upper ſides, on each whereof hang two links which ſtand acroſs, and are faſtened to the two ends of the tongs, which catch hold of the wire, and draw it through the hole. The axis on which the barrel moves does not run through the center, but is placed on one ſide, which is that on which the hooks are placed; and underneath there is faſtened to the barrel a ſpoke of wood, which they call a ſwingle, which is drawn back a good way by the cogs in the axis of the wheel, and draws back the barrel, which falls to again by its own weight. The tongs hanging on the hooks of the barrel, are by the workmen faſtened to the end of the wire, and by the force of the wheel, the hooks being pulled back, draw the wire through the holes. The plate in which the holes are, is iron on the outſide, and ſteel on the inſide; and the wire is anointed with train-oil, to make it run the eaſier.

WISDOM, *ſapientia*, uſually denotes a higher and more refined notion of things immediately preſented to the mind, as it were, by intuition, without the aſſiſtance of ratiocination. See UNDERSTANDING, REASON, KNOWLEDGE, &c.

In this ſenſe wiſdom may be ſaid to be a faculty of the mind, or at leaſt a modification and habit thereof. See FACULTY, MODIFICATION, HABIT, &c.

Sometimes the word is more immediately uſed, in a moral ſenſe, for what we call prudence, or diſcretion, which conſiſts in the ſoundneſs of the judgment, and a conduct anſwerable thereto.

WIT, a faculty of the mind, conſiſting, according to Mr. Locke, in the aſſembling and putting together of thoſe ideas, with quickneſs and variety, in which any reſemblance or congruity can be found, in order to form pleaſant pictures and agreeable viſions to the fancy. This faculty, the ſame author obſerves, is juſt the contrary of judgment, which conſiſts in the ſeparating carefully from one another, ſuch ideas wherein can be found the leaſt difference, thereby to avoid being miſled by ſimilitude and affinity, to take one thing for another. It is the metaphor and alluſion, wherein, for the moſt part, lies the entertainment and pleaſantry of wit, which ſtrikes ſo lively on the fancy, and is therefore ſo acceptable to all people, becauſe its beauty appears at firſt ſight, and there is required no labour of thought to examine what truth or reaſon there is in it. The mind, without looking any farther, reſts ſatisfied with the agreeableneſs of the picture, and the gaiety of the imagination; and it is a kind of affront to go about to examine it by the ſevere rules of truth or reaſon.

WITCHCRAFT, a kind of ſorcery, eſpecially in women, in which it is ridiculouſly ſuppoſed that an old woman, by entering into a contract with the devil, is enabled, in many inſtances, to change the courſe of nature; to raiſe winds; perform actions that require more than human ſtrength; and to afflict thoſe who offend them with the ſharpeſt pains, &c.

In the times of ignorance and ſuperſtition, many ſevere laws were made againſt witches, by which great numbers of innocent perſons, diſtreſſed with poverty and age, were brought to a violent death; but theſe are now happily repealed.

WITENA-MOT, or WITENA-GEMOT, among our Saxon anceſtors, was a term which literally ſignified the aſſembly of the wiſe men, and was applied to the great council of the nation, of latter days called the parliament.

WITHERNAM, in law, a writ that lies where a diſtreſs is driven out of the county, and the ſheriff cannot make deliverance to the party diſtrained; in that caſe this writ is directed to the ſheriff, commanding him to take as many of the beaſts, or goods, of the party into his keeping till he make deliverance of the firſt diſtreſs.

WITHERS of a horſe, the juncture of the ſhoulder-bones at the bottom of the neck and main, towards the upper part of the ſhoulder.

WITNESS, in law, a perſon who gives evidence in any cauſe, and is ſworn to ſpeak the truth, the whole truth, and nothing but the truth.

WOAD, *iſatis*, in botany. See ISATIS.

This is a drug uſed by the dyers to give a blue colour. It ariſes from ſeed ſown annually in the ſpring, which puts forth leaves reſembling thoſe of rib-wort plaintain.

plantain. These plants have usually three, four, or five crops of leaves every year, of which the first is the best, and the rest in their order. When the leaves are ripe, they gather them, and carry them to a woad mill to grind them small; after which they are laid eight or ten days on heaps, and are at length made into a kind of balls, which are laid in the shade on hurdles to dry. This done, they break or grind them to powder; which is then spread on a floor and watered. Here they let it smoke and heat, till by torrifying it every day it becomes quite dry.

A woad blue is a very deep blue, almost black; and is the base of so many sorts of colours, that the dyers have a scale by which they compose the several casts or degrees of woad, from the brightest to the deepest.

WOLD, signifies a plain down, or open champaign ground, hilly and void of wood.

WOLD, or WELD, among dyers. See the article WELD.

WOLF, *lupus*, in zoology, a very large and fierce animal, being equal to the biggest mastiff in size, and having much of the general appearance of that creature: the head is large and fleshy: the eyes are large and prominent, and their iris hazel: the ears are short, patulous, and erect: the teeth are very large, and the animal has a way of shewing them in a frightful manner, by grinning: the neck is robust and thick: the body is large, and the back broad: the legs are very robust: the tail is long and bushy: the natural colour is black, but there are some tawny; and in some places they are in winter perfectly white. The wolf is a very mischievous creature, destroying cattle; and in hard winters attacking houses and villages in whole troops.

WOLF'S BANE, in botany, the English name for the aconitum. See the article ACONITE.

WOLVES TEETH, of an horse, are over-grown grinders, the points of which being higher than the rest, prick his tongue and gums in feeding, so as to hinder his chewing. They are seldom met with in any besides young horses; but if they be not daily worn by chewing, they will grow up even to pierce the roof of the mouth.

WOMAN, *fœmina*, in zoology, the female of man. See the article MAN.

WOMB, *uterus*. See UTERUS.

WOOD, *lignum*, a solid substance, whereof the trunks and branches of trees consist.

The wood is all that part of a tree included between the bark and the pith. See the article BARK.

Dr. Grew, in his Anatomy of Plants, has discovered, by means of the microscope, that what we call wood in a vegetable, notwithstanding all its solidity, is only an assemblage of infinite minute canals, or hollow fibres, some of which rise from the root upwards, and are disposed in form of a circle; and the others, which he calls insertions, tend horizontally from the surface to the center; so that they cross each other, and are interwoven like the threads of a weaver's web. See VEGETATION, SAP, &c.

Notwithstanding this, Mr. Buffon observes, that the organization of wood is yet unknown in all its parts; and that though the world is greatly indebted to the observations of Grew, Malpighi, and Hales, yet when he entered on the subject, he found there was much more unknown than known; and determined to observe, from its first state, the growth of trees, and the formation of their woody part. For this ingenious author's exposition of the texture, &c. of wood, and thence his calculation of the force and strength of timber used in building, we must refer the reader to his paper upon that subject, as published in the Memoirs Acad. Par. for the year 1740, and to what has been said under the article TIMBER.

Mortimer observes, that all kinds of wood are to be preserved from the worm, and from many other occasions of decay, by oily substances, particularly the essential oils of vegetables. Oil of spike is excellent; and oil of juniper, turpentine, or any other of this kind, will serve the purpose; these will preserve tables, instruments, &c. from being eaten to pieces by these vermin; and linseed-oil will serve, in many cases, to the same purpose; probably nut-oil will do also, and this is a sweeter oil, and a better varnish for wood.

Some of the West-Indian trees afford a sort of timber, which, if it would answer in point of size, would have great advantages over any of the European wood in ship-building for the merchant-service, no worm ever touching this timber. The acajou, or tree which produces the cashew-nut, is of this kind; and there is a tree of Jamaica, known by the name of the white-wood, which has exactly the same property; and so have many other of these trees.

To season wood expeditiously for sea-service, Mr. Boyle observes, that it has been usual to bake it in ovens.

Cutting in WOOD, is used for various purposes; as for initial and figured letters, head and tail pieces of books, and even for schemes, mathematical and other figures, to save the expence of engraving on copper; also for prints, and stamps for papers, calicoes, linens, &c.

The invention of cutting in wood, as well as that in copper, is ascribed to a gold-smith of Florence; but Albert Durer and Lucas brought both these arts to perfection.

About 200 years ago, the art of cutting in wood was carried to a very great pitch, and might even vie, for beauty and justness, with that of engraving on copper: at present it is much neglected, the application of artists being wholly employed on copper, as the more easy and promising province: not but that wooden cuts have the advantage of those in copper in many respects, chiefly for figures and devises in books; as being printed at the same time

and in the same press with the letters: whereas for the other, there is required a particular and separate impression.

The cutters in wood begin with preparing a a plank, or block, of the size and thickness required, and very even and smooth on the side to be cut: for this, they usually take pear-tree, or box; but the latter is best, as being closest, and least liable to be worm eaten. On this block they draw the design with a pen or pencil, exactly as they would have it printed; or they fasten the design drawn on paper upon the block with paste and a little vinegar, the strokes or lines turned towards the wood. As soon as the paper is dry, they wash it gently with a sponge dipped in water, and then take it off by little and little, rubbing it first with the tip of the finger, till nothing is left on the block but the strokes of ink that form the design, which mark out what part of the block is to be spared or left standing. The rest they cut off very carefully with the points of very sharp knives, chissels, or gravers, according to the bigness or delicacy of the work.

WOOD, *Silva*, in geography, a multitude of trees extended over a large continued tract of land, and propagated without culture. The generality of woods only consist of trees of one kind.

The ancient Saxons had such a veneration for woods, that they made them sanctuaries.

The burning of woods, or under-wood, is declared to be felony; also those persons that maliciously cut or spoil timber-trees, fruit-trees, &c. shall be sent to the house of correction, there to be kept three months, and whipt once a month.

WOODBIND, the English name for a species of lonicera. See the article LONICERA.

WOODCOCK, *Scolopax*, in ornithology. See the article SCOLOPAX.

WOOD *and* WOOD, in the sea language, is when two pieces of timber are so let into each other, that the wood of the one joins close to the other.

WOOD-LOUSE, in zoology, a name given to several species of oniscus. The common wood-louse, or millepes, is the oniscus with a blunt forked tail. See ONISCUS and MILLEPES.

WOOD-PECKER, *Picus*, in ornithology, a genus of birds with the beak straight, of a polyhedral or many-sided figure, and with its point formed in the manner of a wedge; the tongue is rounded and very long, it resembles in form a worm, or some other such insect; the toes, in all but one species, stand two before and two behind, as in the parrot. Of this genus there are several species.

WOOD-SORREL, *Oxalis*, in botany. See the article OXALIS.

WOODWARD, an officer of the forest, whose function it is to look after the woods, and observe any offences either in vert or in venison, committed within his charge, and to prevent the same; and in case any deer are found killed, or hurt, to inform the verderer thereof, and to present them at the next court of the forest. See FOREST.

WOOF, among manufacturers, the threads which the weavers shoot across with an instrument called a shuttle.

The woof is of different matter, according to the piece to be wrought. In taffety, both woof and warp are silk. In mohairs, the woof is usually wool and the warp silk. In sattins, the warp is frequently flax, and the woof silk. See the articles WARP and WEAVING.

WOOL, the covering of sheep. Each fleece consists of wool of several qualities and degrees of fineness, which the dealers therein take care to separate.

The English and French usually separate each fleece into three principal sorts, viz. 1. Mother-wool, which is that of the back and neck. 2. The wool of the tails and legs. 3. That of the breast and under the belly. The wool most esteemed is the English, chiefly that about Leominster, Cotswold, and the Isle of Wight; the Spanish, principally that about Segovia; and the French, about Berry.

The fineness and plenty of our wool is owing, in a great measure, to the short sweet grass in many of our pastures and downs; though the advantage of our sheeps feeding on this grass all the year, without being obliged to be shut up under cover during the winter, or to secure them from wolves at other times, contributes not a little to it.

Antiently, the principal commerce of the nation consisted in wool unmanufactured; which foreigners, especially the French, Dutch, and Flemish, bought of us; insomuch, that the customs paid on wool exported, in the reign of Edward III. amounted, at 50*s.* the pack, to 250,000*l.* per annum: an immense sum in those days!

But as wool is now accounted a staple commodity, the employment of an infinite number of people at home, and our most beneficial trade abroad, depending upon it, very severe laws have been made to prevent its being exported, and persons that export wool beyond the seas, are liable to a forfeiture of the ships or vessels in which it is found, with treble the value, and the persons aiding and assisting in it, shall suffer three years imprisonment.

It is also enacted, that no sheep shall be carried on board any ship with intent to be exported, upon forfeiture of 20*s.* for every sheep; that the owners knowing thereof, are to forfeit their interest therein; that if they be aliens, or natural born subjects not inhabiting this kingdom, such ships shall be wholly forfeited; that the masters or mariners knowing thereof, and assisting therein, are to forfeit all their goods and chattels, and to suffer three months imprisonment; and that the exporter, besides

ſides other penalties, ſhall be rendered incapable of ſuing for any debt, &c.

As to the importation of wool, Iriſh wool, combed or uncombed, Spaniſh or Poliſh wool, may be imported duty free.

WOOL, is alſo uſed for the ſoft hair growing on ſeveral wild beaſts, the ſkins of which are diſtinguiſhed by the name of furs. See FUR.

Cotton WOOL. See the article COTTON.

WOOL-STAPLE, denotes a city or town where wool uſed to be ſold. See the article STAPLE.

WOOL-WINDERS, are perſons employed in winding up fleeces of wool into bundles to be packed and ſold by weight. Thoſe are ſworn to do it duly between the owner and the merchant.

WOOLLEN MANUFACTORY, includes the ſeveral ſorts of commodities into which wool is wrought, as broad cloth, long and ſhort kerſeys, bays, ſerges, flannel, perpetuanas, ſays, ſtuffs, frize, penniſtones, ſtockings, caps, rugs, &c. See the article CLOTH, &c.

WOOLSTED. See the article WORSTED.

WORD, in language, an articulate ſound deſigned to repreſent ſome idea.

The port-royaliſts define words to be diſtinct articulate ſounds, agreed on by mankind to convey their thoughts and ſentiments by.

Word, in writing, is defined to be an aſſemblage of ſeveral letters forming one ar more ſyllables, and expreſſing the name, quality, or manner of a thing.

Etymology and ſyntax being the two parts of grammar converſant about words, the firſt of theſe explains the nature and propriety of words, and the other treats of the right compoſition of words in diſcourſe.

The moſt remarkable thing in the pronouncing of words, is the accent, or the elevation of the voice, on ſome particular ſyllable of the word, which elevation is neceſſarily followed by a depreſſion of the voice.

Grammarians generally divide words into eight claſſes, called parts of ſpeech.

Words are again divided into primitives and derivatives, ſimple and compound, ſynonimous and equivocal.

With regard to their ſyllables, words are farther divided into monoſyllables and polloſyllables.

The grammatical figures of words which occaſion changes in the form &c. thereof are proſtheſis, aphæreſis, ſyncope, epentheſis, apodope, paragoge, craſis, diæreſis, metatheſis, and antitheſis.

The uſe of words, we have obſerved, is to ſerve as ſenſible ſigns of our ideas; and the ideas they ſtand in the mind of the perſon that ſpeaks, are their proper ſignifications.

Simple and primitive words have no natural connection with the things they ſignify, whence there is no rationale to be given of them; it is by mere arbitrary inſtitution and agreement of men, that they come to ſignify any thing. Certain words have no natural propriety or aptitude to expreſs certain thoughts more than others; were that the caſe there could have been but one language. But in derivative, and compound words the caſe is ſomewhat different. In the forming of theſe, we ſee regard is had to agreement, relation, and analogy; thus moſt words that have the ſame ending, have one common and general way of denoting or ſignifying things; and thoſe compounded with the ſame prepoſitions, have a ſimilar manner of expreſſing and ſignifying ſimilar ideas, in all the learned languages where they occur.

For the perfection of language, it is not enough, Mr. Locke obſerves, that ſounds can be made ſigns of ideas, unleſs theſe can be made uſe of ſo as to comprehend ſeveral particular things; for the multiplication of words would have perplexed their uſe, had every particular thing needed a diſtinct name to be ſignified by. To remedy this inconvenience, language had a further improvement in the uſe of general terms, whereby one word was made to mark a multitude of particular exiſtances; which advantageous uſe of ſounds was obtained by the difference of the ideas they were made ſigns of, thoſe names becoming general which are made to ſtand for general ideas, and thoſe remaining particular, where the ideas they are uſed for are particular.

It is obſervable, that the words which ſtand for actions and notions, quite removed from ſenſe, are borrowed from ſenſile ideas; as to imagine, apprehend, comprehend, underſtand, adhere, conceive, inſtil, diſguſt, diſturbance, tranquility, &c. which are all taken from the operations of things ſenſible, and applied to modes of thinking. Spirit, in its original ſignification, is no more than breath; angel, a meſſenger. By which we may gueſs what kind of notions they were, and whence derived, which filled the minds of the firſt beginners of languages; and how nature, even in the naming of things unawares, ſuggeſted to men the originals of all their knowledge: whilſt to give names that might make known to others any operations they felt in themſelves, or any other ideas that came not under their ſenſes, they were forced to borrow words from the ordinary and known ideas of ſenſation.

The ends of language, in our diſcourſe with others, are chiefly three; firſt, to make our thoughts or ideas known one to another. This we fail in, 1. when we uſe names without clear and diſtinct ideas in our mind. 2. When we apply received names to ideas, to which the common uſe of that language doth not apply them. 3. When we apply them unſteadily, making them ſtand now for one, and anon for another idea. Secondly, to make known our thoughts with as much eaſe and quickneſs, as poſſible. This men fail in when they have complex ideas, without having diſtinct names for them, which

which may happen either through the defect of a language which has none, or the fault of the man who has not yet learned them. Thirdly, to convey the knowledge of things. This cannot be done but when our ideas agree to the reality of things. He that has names without ideas, wants meaning in his words, and ſpeaks only empty ſounds. He that has complex ideas without names for them, wants diſpatch in his expreſſion. He that uſes his words looſely, and unſteadily, will either not be minded or not underſtood. He that applies names to ideas, different from the common uſe, wants propriety in his language, and ſpeak gibberiſh; and he that has ideas of ſubſtances diſagreeing with the real exiſtence of things, ſo far, wants the materials of true knowledge.

WORD, or *Watch* WORD, in an army or garriſon, is ſome peculiar word or ſentence, by which the ſoldiers know and diſtinguiſh one another in the night, &c. and by which ſpies and deſigning perſons are diſcovered. It is uſed alſo to prevent ſurprizes. The word is given out in an army every night to the lieutenant, or major general of the day, who gives it to the majors of the brigades, and they to the adjutants; who give it firſt to the field officers, afterwards to a ſerjeant of each company, who carry it to the ſubalterns. In garriſons it is given after the gate is ſhut to the town major, who gives it to the adjutants and they to the ſerjeants.

WORKS, *Opera*, in fortification, the ſeveral lines, trenches, ditches, &c. made round a place or army, or the like, to fortify and defend it.

WORLD, *Mundus*, the aſſemblage of parts which compoſe the univerſe. See the article UNIVERSE.

The duration of the world is a thing which has been greatly diſputed. Plato after Ocellus Lucanus, held it to be eternal, and to have flowed from God as rays flow from the ſun. Ariſtotle was much of the ſame mind; he aſſerts that the world was not generated ſo as to begin to be a world, which before was none: he lays down a pre-exiſting and eternal matter as a principle, and thence argues the world eternal. His arguments amount to this, that it is impoſſible an eternal agent, having an eternal paſſive ſubject, ſhould continue long without action. His opinion was generally followed, as ſeeming to be the fitteſt to end the diſpute among ſo many ſects about the firſt cauſe. See the articles MATTER, CAUSE, and PERIPATETIC *Philoſophy*.

Epicurus, however, though he makes matter eternal, yet ſhews the world to be but a new thing formed out of a fortuitous concourſe of atoms. See the articles ATOMICAL and EPICUREAN.

Some of the modern philoſophers refute the imaginary eternity of the world by this argument, that if it be *ab eterno*, there muſt have been a generation of individuals in a continual ſucceſſion from all eretnity, ſince no cauſe can be aſigned why they ſhould not be generated, viz. one from another. Therefore to conſider the origin of things, and the ſeries of cauſes, we muſt go back in infinitum, i. e. there muſt have been an infinite number of men and other individuals already generated, which ſubverts the very notion of number. And if the cauſe which now generates has been produced by an infinite ſeries of cauſes, how ſhall an infinite ſeries be finite? Dr. Halley ſuggeſts a new method of finding the age of the world from the degree of the ſaltneſs of the ocean. See SEA.

WORMS, in the Linnæan ſyſtem of nature, a claſs of inſects of the order of the apteria, and of the claſs of the anarthra.

The diſtinguiſhing character of this claſs is, that they have the muſcles of their body affixed to a ſolid baſis. The ſeveral ſpecies of worms are very numerous; as the chætia, or the hair worm, called alſo the guinea worm; the aſcaris, the lumbricus or the earth worm; and ſea-worm; the tænia, or tape worm; the ſicyania or gourd worm; the iulus or gally-worm, &c.

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WORM-SEED, *Semen Santonicum*, is the ſeed of a ſpecies of worm-wood which grows in the Levant, from whence we have the ſeed, which is there produced in great plenty without the trouble of ſowing; this plant growing wild in the fields.

The ſeed of this plant is light and chaffy, enveloped with a vaſt number of thin membranes, that have the ſame virtue with the ſeed itſelf, and are uſed with it under its name.

It is a ſmall and light ſeed, of a pale yellowiſh brown colour, with ſome admixture of greeniſh in it; of an oblong form, ſomewhat larger at the baſe, and tapering to a point at the ſummit. It is of a friable texture, eaſily beat to powder. It has not much ſmell, but is of a bitter taſte.

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which may happen either through the defect of a language which has none, or the fault of the man who has not yet learned them. Thirdly, to convey the knowledge of things. This cannot be done but when our ideas agree to the reality of things. He that has names without ideas, wants meaning in his words, and ſpeaks only empty ſounds. He that has complex ideas without names for them, wants diſpatch in his expreſſion. He that uſes his words looſely, and unſteadily, will either not be minded or not underſtood. He that applies names to ideas, different from the common uſe, wants propriety in his language, and ſpeak gibberiſh; and he that has ideas of ſubſtances diſagreeing with the real exiſtence of things, ſo far, wants the materials of true knowledge.

WORD, or *Watch* WORD, in an army or garriſon, is ſome peculiar word or ſentence, by which the ſoldiers know and diſtinguiſh one another in the night, &c. and by which ſpies and deſigning perſons are diſcovered. It is uſed alſo to prevent ſurprizes. The word is given out in an army every night to the lieutenant, or major general of the day, who gives it to the majors of the brigades, and they to the adjutants; who give it firſt to the field officers, afterwards to a ſerjeant of each company, who carry it to the ſubalterns. In garriſons it is given after the gate is ſhut to the town major, who gives it to the adjutants and they to the ſerjeants.

WORKS, *Opera*, in fortification, the ſeveral lines, trenches, ditches, &c. made round a place or army, or the like, to fortify aud defend it.

WORLD, *Mundus*, the aſſemblage of parts which compoſe the univerſe. See the article UNIVERSE.

The duration of the world is a thing which has been greatly diſputed. Plato after Ocellus Lucanus, held it to be eternal, and to have flowed from God as rays flow from the ſun. Ariſtotle was much of the ſame mind; he aſſerts that the world was not generated ſo as to begin to be a world, which before was none: he lays down a pre-exiſting and eternal matter as a principle, and thence argues the world eternal. His arguments amount to this, that it is impoſſible an eternal agent, having an eternal paſſive ſubject, ſhould continue long without action. His opinion was generally followed, as ſeeming to be the fitteſt to end the diſpute among ſo many ſects about the firſt cauſe. See the articles MATTER, CAUSE, and PERIPATETIC *Philoſophy*.

Epicurus, however, though he makes matter eternal, yet ſhews the world to be but a new thing formed out of a fortuitous concourſe of atoms. See the articles ATOMICAL and EPICUREAN.

Some of the modern philoſophers refute the imaginary eternity of the world by this argument, that if it be *ab eterno*, there muſt have been a generation of individuals in a continual ſucceſſion from all eretnity, ſince no cauſe can be aſigned why they ſhould not be generated, viz. one from another. Therefore to conſider the origin of things, and the ſeries of cauſes, we muſt go back in infinitum, i. e. there muſt have been an infinite number of men and other individuals already generated, which ſubverts the very notion of number. And if the cauſe which now generates has been produced by an infinite ſeries of cauſes, how ſhall an infinite ſeries be finite? Dr. Halley ſuggeſts a new method of finding the age of the world from the degree of the ſaltneſs of the ocean. See SEA.

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the fibres, while ſluggiſh; by which means, the groſs humours are attenuated, and brought back into the common road of circulation: it reſtores the debillitated functions of the viſcera, and is an excellent ſtomachic: it is good in the dropſy, green-ſickneſs, cachexies, and agues, which laſt it has often been known to cure. It alſo, by its great bitterneſs, is of ſome ſervice againſt worms, by reſolving the mucilaginous humours in which their eggs are contained: however, in all hot diſeaſes and inflammatory diſpoſitions it is not ſafe.

Several medicinal compoſitions are prepared from it; and, among others, the abſinthites vinum, or wormwood-wine, which is made in the following manner: Take four pounds of the tops of each of the two firſt kinds, when freſh and in bloom, cleanſe and either mince or bruiſe them; then put them, together with three drams of powdered cinnamon, into a barrel that will contain fifty quarts; fill the barrel with muſt, freſh expreſſed from the white grape, and ſet the barrel in a cellar, leaving the wine to ferment: when the fermentation is over, fill up the caſk with white wine; bottle it and keep it for uſe.

Or it may be made in this manner, at any time: Take the dried leaves of the two ſorts of wormwood, of each ſix drams, and pour thereon two quarts of white wine; then put them together into a large bottle, and ſet them in a cool place to macerate, twenty-four hours; then, having ſqueezed out the leaves, filtrate the liquor, which you may keep for uſe.

WORSHIP, the offering up of adoration, prayer, praiſe, thankſgiving, and confeſſion to God, as our creator, benefactor, law-giver, and judge.

WORSTED, a kind of woollen thread, which, in the ſpinning, is twiſted harder than ordinary. It is chiefly uſed either wove or knit into ſtockings, caps, gloves, or the like.

WOULDING, a ſea term, for the winding of ropes round a maſt or yard of a ſhip, that has been ſtrengthened by a piece of timber nailed to it.

WOUND, *Vulnus*, in medicine and ſurgery, is frequently defined to be a violent ſolution of the continuity of the ſoft external parts of the body, made by ſome inſtrument. Others take a greater latitude in defining it, and call every external hurt of the body, by what cauſe ſoever produced, a wound. On the other hand, ſome are of opinion, that unleſs the injured parts of the body are divided by ſome ſharp inſtrument, as by a ſword or knife, it is by no means to be called a wound; but notwithſtanding, it is certain that thoſe wounds which are produced by blunt inſtruments may properly enough be called wounds, whence Heiſter diſtinguiſhes two different kinds of wounds, the one made by acute, the other by blunt inſtruments.

Wounds are generally inflicted upon the ſofter parts of the human body, ſuch as the ſkin, fat, muſcular fleſh, ligaments, blood-veſſels, and nerves, and parts that are compoſed of theſe, as the viſcera and inteſtines; yet the more ſolid parts of the body are by no means to be here excluded, as the bones, whence the parts that are ſubject to thoſe injuries will afford two diſtinctions of wounds; one, wounds of the ſofter parts, the other, wounds of the bones.

As cauſes of wounds, all inſtruments of what kind ſoever, whether blunt or ſharp, may properly be reckoned, provided they are of ſuch a nature, that upon the violent external application of them, they are capable of producing a ſolution of continuity in the parts of the body upon which they are inflicted; for a ſolution of the external parts by internal cauſe, is not called a wound, but rather an abſceſs, or ulcer; ſo when the harder parts of the body (as the bones) are broken by a fall, or a violent blow received from a blunt inſtrument, it is called a fracture.

The effects which are produced by wounds, beſides the diviſion of the ſofter parts, are generally profuſions of blood, though they are ſometimes attended with much greater miſchiefs than theſe; for it can ſcarcely happen, but that the divided parts muſt, in ſome meaſure, if not totally, loſe their natural functions, according to the different uſes for which the part is intended, and according to the different degrees of injury that it receives.

The greater number of uſes a part is intended for by nature, the worſe will be the conſequences of a wound upon that part; this principle is ſo extenſive, that it is the conſtant guide in forming a prognoſtic, whether a wound will prove mortal or not. He, therefore, who is beſt ſkilled in anatomy, that is, beſt inſtructed in the ſituation of the parts, and their uſes, will be enabled to form the moſt accurate judgment of the conſequence that will neceſſarily attend a wound upon any particular part.

What has been ſaid of the different ſituations and cauſes of wounds, ſufficiently demonſtrates, that there are many different kinds of wounds, ſome brought on by a puncture, ſome by a ſtab, and ſome again by a blow; ſome are curable, others incurable; ſome are made with ſharp inſtruments, others with blunt ones: with regard to their figure, ſome form a right line, others are curved, tranſverſe, or oblique: with reſpect to their ſituation, ſome are placed in the head, others in the neck, thorax, or abdomen; and of theſe, ſome are internal, others external. Variety of different wounds ariſe from the great diverſity of condition that wounds are left in; for in ſome wounds, the inflicting inſtrument, or part of it, remains; for inſtance, a leaden bullet, a piece of glaſs, or of a granade; the points of arrows or ſwords: but in ſome wounds, nothing of this kind is left: ſometimes fractures of the bones accompany wounds, which is generally the caſe in gun-

gun-ſhot wounds: ſome wounds are alſo attended with poiſon, as thoſe which are made with poiſoned arrows; under this head may be ranked the bites of animals, but more particularly of mad or venomous animals. Some are of opinion, that wounds which are made with copper, or ſilver inſtruments, ſhould be reckoned in this claſs, the poiſon of which, if there is any, is owing to the vitriol that is mixed with theſe metals.

In ſlight wounds, where no conſiderable artery, nerve, or tendon is concerned, the following appearances are uſually remarkable; at firſt ſight, the wound appears as a red line drawn upon the part; but upon being dilated, the blood inſtantly guſhes out in greater or ſmaller quantities, according to the ſize and number of the blood-veſſels that are injured.

The hæmorrhage, after a ſhort continuance, ſtops of its own accord, and the blood concreting in the wound, forms a cruſt; the lips of the wound now begin to look red, and ſwell, and are attended with ſome degree of pain and inflammation; if it is a large wound, a fever, that is to ſay, an univerſal heat and quickneſs of pulſe, almoſt always enſue upon the third or fourth day; ſooner or later, a white glutinous humour appears, not unlike oil, and this is known by the name of pus, or matter; upon appearance of matter, the redneſs, tumour, pain, inflammation, and fever, diſappear entirely, or at leaſt are abated; and theſe are the ſigns of a wound inclining to heal; for under the matter, new fleſh ſprings up from the wounded veſſels, which having by degrees filled the wound, dries upon its upper part, and forms a cicatrix. See the article CICATRIX.

In dangerous wounds, that is, where any conſiderable blood-veſſel is wounded or divided, there generally enſues ſo violent a hæmorrhage, that the wounded perſon is in an inſtant ſenſible of great loſs of ſpirits, and weakneſs, and faints away: and when the larger arteries are wounded, whether they are internal or external, he dies upon the ſpot; altho' ſomewhat leſs danger is apprehended from wounds that are inflicted upon the veſſels, which are ſituated upon the external parts of the body (ſome few excepted) becauſe they will admit of the ligature, and other means of reſtraining the violence of the hæmorrhage.

There is nothing will give a truer light into the nature and conſequence of a deep wound, than a due conſideration of what natural actions of the body are impeded thereby. For inſtance, in wounds of the breaſt, when the patient draws his breath with ſhortneſs and difficulty, and is at the ſame time attended with a hæmoptyſis and hiccough, it may be rationally conjectured, that the lungs or the diaphragm are wounded; ſo in wounds of the abdomen, when chyle is voided, it is a plain indication that the ſtomach, ſmall guts, or lacteals are wounded: when excrements paſs by the wound, the great guts are wounded.

Bilious blood likewiſe ſhews the liver or gall-bladder to be divided: if urine paſſes by the wound, the urinary bladder, or elſe the ureters, are wounded; and bloody urine denotes a blow on the kidneys, or a wound of the bladder; but when there are large profuſions of blood this way, it is a ſign that ſome of the larger blood-veſſels are wounded: vomitting of blood declares the ſtomach to be the injured organ: violent pains attended with convulſive twitches, ſhew that a nerve is wounded, or elſe that ſome foreign ſubſtance is left in the wound. Whenever the ſenſes are diſordered after a wound received on the head, a concuſſion of the brain is much to be feared. Difficulty of breathing, pains in the breaſt, and hiccoughing, are ſymptoms of a wound in the diaphragm.

It is of bad conſequence for a wound to be attended with a large tumour; but it is of the laſt conſequence if it is attended with no degree of tumour at all: the firſt is an indication of great inflammation, the laſt of mortification; ſome degree of tumour is always therefore beſt in wounds.

In order to enquire what wounds admit of a cure, and what are incurable, Heiſter divides wounds into three ſorts. 1. Some wounds are abſolutely of themſelves mortal. 2. Others are in their own nature mortal, if not relieved by timely aſſiſtance. And, 3. Others become mortal by accident or imprudent treatment, though they were otherwiſe curable.

1. We properly ſtyle thoſe wounds mortal which are not to be remedied by all the art and induſtry of man. Thus, wounds are of this kind which are attended with ſo violent an hæmorrhage as to produce inſtant death: of this ſort are reckoned wounds that penetrate the cavities of the heart, and all thoſe wounds of the viſcera where the large blood-veſſels are opened; ſuch are large wounds of the lungs, liver, ſpleen, kidneys, ſtomach, inteſtines, meſentery, pancreas, uterus; of the aorta, of the iliac, cœliac, renal, meſenteric, and carotid arteries: eſpecially if they are wounded near their origin: of the ſubclavian alſo, or vertebral; of the vena cava, iliac vein, the internal jugular, vertebral, renal, meſenteric; of the vena porta, and of the larger veins that lie deep in the body, becauſe their ſituation will not admit of proper applications to reſtrain the flux of blood. Heiſter therefore reckons, very juſtly, theſe among the wounds that are abſolutely incurable, ſince they are not remediable either by aſtringents, ligature, or fire.

Thoſe wounds alſo are not leſs mortal than the former, which obſtruct, or entirely cut off the paſſage of the animal ſpirits to the heart; ſuch are wounds of the cerebellum, of the medulla oblongata, and ſome violent ſtrokes of the brain itſelf.

There is reaſon to apprehend very great danger, when

the ſmall veins or arteries which are contained in the cranium, are injured; for the blood flowing from them into the internal ſinuſes of the brain, either produces too great a preſſure upon thoſe very tender parts of the brain, and ſo obſtructs the courſe of the blood and ſpirits; or elſe, being corrupted, it putrifies the brain itſelf, if it cannot be evacuated by the aſſiſtance of the trepan; which is the caſe when this accident happens at the lower part of the cranium, or in the ſinuſes of the brain: nor is there leſs danger where the nerves, which tend to the heart, are wounded, or entirely divided; for, after this, it is impoſſible for the heart to continue its motion. See TREPAN.

To this claſs are to be referred alſo all wounds which entirely deprive the animal of the faculty of breathing: there is therefore great danger where the aſpera arteria is entirely divided; for where it is only divided in part, it may be healed again by the aſſiſtance of an expert ſurgeon.

To this place alſo belong violent ſhocks of the bronchia, mediaſtinum, and diaphragm, eſpecially the tendinous part of it. See the articles ASPERA ARTERIA, &c.

Thoſe wounds alſo which interrupt the courſe of the chyle to the heart, are no leſs incurable than the former; ſuch are wounds of the ſtomach, inteſtines, receptacle of the chyle, thoracic duct, and larger lacteals: to which may be alſo added, wounds of the œſophagus, if they are large; though death is not ſo ſudden an attendant on theſe wounds; but, for want of nouriſhment, the perſons afflicted by them are weakened by degrees, and at length die conſumptive.

In this account, thoſe wounds alſo are not to be omitted, which are inflicted upon membranous parts, that are ſituated in the abdomen, and contain ſome ſecreted fluid, as on the bladder (either of the bile or urine) the ſtomach, inteſtines, receptacle of the chyle, and lacteal veſſels. The fluids contained in theſe parts, when once they are let looſe into the cavity of the abdomen, cannot be properly diſcharged, and therefore eaſily corrode the internal parts of the body; and the membranes that contained them are generally ſo fine, that they will not admit of agglutination, eſpecially ſince no medicine from without can be applied. A few indeed have recovered after ſlight wounds in theſe parts; but ſince the number of theſe inſtances is but few, and the cure in them has been accidental, and not performed by the ſurgeon's art, theſe may very juſtly be added to the liſt of mortal wounds. See ABDOMEN, &c.

2. Many wounds there are which, though the the experienced ſurgeon could remedy, yet prove fatal if neglected or left to nature: of this number are thoſe which produce inſtant death, unleſs relieved by preſent aſſiſtance; ſuch are wounds of the larger external blood-veſſels, which might be remedied by ligature, by the application of aſtringent medicines, or the actual cautery.

Of this kind are wounds of the brachial or crural artery, unleſs they are too near the trunk of the body; wounds in the large arteries of the cubit, or tibia; of the branches of the external carotid or temporal artery: to theſe alſo may be added, wounds of the jugular and other veins, ſituated upon the external parts of the body; but in theſe caſes no help can be given, unleſs the ſurgeon be brought before there has been a vaſt profuſion of blood. See CRURAL ARTERY, &c.

3. Wounds are properly ſaid to become mortal by accident, where the patient's death, from them, is occaſioned either by the ill conduct of the patient himſelf, or by the neglect or ignorance of his ſurgeon; the wound itſelf being of the number of thoſe deemed curable by the judicious practiſer.

Under this head may be reckoned, 1. Thoſe wounds which the ſurgeon has neglected to cleanſe ſufficiently, though he had it in his power to do it; as when ſome foreign body, which might eaſily have been extracted, is left in the wound, and produces inflammations, hæmorrhages, convulſions, and, finally, death itſelf: ſo in wounds of the thorax and abdomen, if the ſurgeon is not diligent in evacuating the grumous blood, it will corrupt there, and by drawing the neighbouring parts into conſent, will expoſe the patient to death: great care muſt alſo be taken that the lips of the wound do not cloſe, till the blood that is collected in the cavity of the body be all evacuated if poſſible, which will be eaſily perceived by the difficulty of breathing, and other bad ſymptoms going off; but if any of the larger internal veſſels are wounded, then all attempts to diſcharge the blood are vain, for the violence of the hæmorrhage takes off the patient.

2. Wounds are alſo to be accounted mortal by accident, which are treated or ſearched in too rough a manner by the ſurgeon; for if wounds are handled roughly, which are full of nervous parts, or of large blood-veſſels, there is danger of bringing on hæmorrhages, convulſions, inflammations, gangrenes, and finally, death itſelf.

3. The caſe is alſo the ſame in external wounds, which are ſlight of themſelves, but under which the patient is loſt by the inflammation, which is increaſed and brought on by the ſurgeon's injudicious treatment.

4. When any one is taken off by the violence of the hæmorrhage from a wound of the hand or foot; for in this caſe, the ſurgeon might have eaſily ſtopped the blood by the application of proper remedies, or by ligature.

5. When the patient is guilty of any intemperance in eating or drinking, or of any exceſs of paſſion, of expoſing himſelf to the cold air, or of uſing violent exerciſe. For by theſe means, wounds, more eſpecially thoſe of the head, by being liable

to freſh hæmorrhages, and other dangerous accidents, frequently become mortal, notwithſtanding they naturally would not prove ſo, and though the ſurgeon uſes his utmoſt care and ſkill. See HÆMORRHAGE.

6. Among theſe, alſo, are to be accounted thoſe wounds of the head, where the patient is loſt by the vaſt quantity of blood which is extravaſated in the cavity of the cranium, and confined there; but where he might have been relieved if the trepan had been applied in time; for though wounds of this kind generally prove incurable, yet, as there is at leaſt a probability of ſaving a perſon in theſe circumſtances, by the uſe of the trepan, this may properly be reckoned among the doughtful caſes, and not deemed abſolutely mortal.

7. And laſtly, a bad habit of body prevents the cure of wounds, which would admit of an eaſy cure in healthy ſubjects; ſo we often ſee the ſlighteſt puncture on the hand or foot of an hydropical, conſumptive, or ſcorbutic perſon, ſhall produce a gangrene, and prove mortal; though the ſurgeon ſpares no care nor application to prevent it. See GANGRENE, &c.

Cure of WOUNDS. Since a wound is a ſolution of the continuity of the parts of the body, the reunion of thoſe parts ſeems to be the principal intention; but ſince wounds are of very different kinds, ſome ſlight, and others of great conſequence, in proportion to this difference, ſo will the manner of proſecuting this intention differ.

The cure of ſlight wounds is generally performed with great eaſe, by applying a ſmall portion of lint to the part, well ſaturated with ſpirit of wine, oil of eggs, turpentine, baſilicon, the balſam of Arcæus, of Peru, ſecuring the dreſſings with a plaſter, and renewing them once in a day or two: by this means, the lips of the wound will preſently agglutinate.

Wounds which are attended with ſome danger, are to be treated as follows: in the firſt place, the wound is to be cleanſed of all extravaſated blood, ſordes, &c. in the next place, if a bullet, the point of a ſword, any part of the clothing, a piece of glaſs, or any other foreign body, ſhall remain in the wound, it is to be removed by the fingers, or with proper inſtruments, as has been already explained under articles EXTRACTION and GUN-SHOT-*Wounds*; which ſee.

The hæmorrhage is to be ſtopped at the firſt dreſſing; the divided parts are to be brought as near each other as poſſible, and their ſituation is to be ſo maintained, that the cicatrix which is left may appear even.

Among the number of the moſt ſimple wounds, are reckoned thoſe which are made by puncture, or ſtabbing upon the external parts, and not penetrating deep; for the method of treating which, ſee PUNCTURE.

The method of treating a cut, or ſuch a wound as is made by a cutting inſtrument, where no part of the fleſh is taken off, and the accident happens to the external parts of the body, and does not penetrate deep, after the wound is cleanſed, it ſhould be dreſſed with the ſame vulnerary balſam, and the lips of the wound ſhould be cloſed, and kept in that ſituation. This is done after different methods, according to the difference of the wound; as,

1. It is to be done by placing the wounded part in a proper poſture, that is, as ſoon as the wound is dreſſed, the part ſhound be placed in ſuch a ſituation, that the divided parts may be moſt likely to keep in conſtant contact.

2. By a proper bandage, tying up the parts ſo that the lips may meet, and thereby eaſily unite.

3. By a proper ſuture, which differs according to the difference of the wound, but may be generally divided into the dry and bloody ſuture; the dry, or as ſome call it, the baſtard ſuture, is the application of ſticking plaſters, to keep the lips of the wound united; the bloody, or true ſuture, is performing the ſame thing with a needle and thread. See SUTURE.

If the wound heals by the aſſiſtance of the ſuture, the threads or ligatures are to be cut near the knots; the lower lip of the wound is to be ſuſpended with one hand, while the threads are gently drawn out by the other; the punctures that are left will eaſily heal by the application of a vulnerary water, called by the French, *l'eau d'arquebuſade*; or by injecting aqua calcis, or ſpirit of wine, and laying on compreſſes dipped in the ſame liquors: but larger wounds are to be dreſſed with the balſam of Arcæus, or balſam of capivi, and the lips kept firm together, with ſome ſticking plaſter till a firm cicatrix is formed.

Where there is a loſs of ſubſtance, the wound will not unite either by the help of plaſter, or ſuture, till it is filled up with new fleſh. For this purpoſe, you will find lint dipped in oil, or ſpread with ſome vulnerary balſam, or ointment, and applied to the bottom of the wound, very ſerviceable, covering it with a plaſter, compreſs and proper bandages, and this dreſſing is to be repeated daily.

As hot or cold air is very hurtful to wounds, ſo it muſt by all means be kept from them; for which reaſon, the ſurgeon ſhould be careful not to remave the old dreſſings till the freſh ones are got ready, and to be as expeditious as poſſible in applying them. After this, when a white, even, thick matter appears in the wound, it ſhould be dreſſed as you ſee occaſion, every day, or every other day; the ſuperfluous matter ſhould be wiped away with a very light hand; for it is better to leave ſome behind, than to treat the wound roughly. Theſe rules being obſerved, the fleſh will ſpring up preſently, and the wound unite; and in order to perfect the cure of the wound, an even cicatrix ſhould, if poſſible, be procured; for the method of obtaining which, ſee PUS.

When any uncleanneſs or foulneſs is perceived in a wound, that is, if the fleſh is putrid, fungous, black, or livid, it muſt be well cleanſed before any attempt is made to heal it; for which purpoſe, apply a digeſtive ointment, made with turpentine, yolk of eggs, and honey of roſes; and where this is not ſtrong enough, ſubſtitute the Egyptian ointment, or ſpirit of wine diluted; or, if you require more ſtrength, uſe red precipitate mercury. Applications of this kind are to be continued till the wound is entirely clean; after which, recourſe is to be had to the methods already preſcribed.

If the new fleſh ſhould be luxuriant, and riſe up ſo as to prevent the formation of an even cicatrix, it muſt be taken down with green vitriol, or a powder compoſed of burnt alum, and red precipitate mercury; at the ſame time making a proper preſſure, with the plaſters, compreſſes, and bandages, till the parts are even. See FUNGUS.

The patient ſhould obſerve a ſtrict regimen with regard to his diet and manner of life, as nothing forwards the cure ſo much as a good habit of body, which may be procured by obſerving a ſtrict regularity with regard to diet, air, keeping the paſſions under, and indulging neither too much ſleep, nor ſuffering too great wakefulneſs; and it is to be obſerved, that the greater tendency there is in a patient to a diſeaſed ſtate of body, ſo much the ſtricter courſe of life ought he to obſerve.

The bowels ſhould by all means be kept open, eſpecially in thoſe who have received a wound in the head; however, it is to be obſerved, that ſtrong cathartic medicines are to be avoided; but it is not only ſafe, but adviſeable, to eat and drink thoſe things that may at the ſame time nouriſh and keep the body open. To this end the patient may drink plentifully of tea or coffee, may eat ſtewed prunes, roaſted apples; but hard meats of all kinds are forbid: where the patient is ſo bound up, that a diet of this kind has no effect, it will be neceſſary to have recourſe to medicines, but then thoſe muſt be of the mildeſt kind; here a gentle clyſter may be given, a ſuppoſitory may be uſed, or an ounce or two of manna, or ſome purging ſalts in warm broth may be preſcribed: whenever the violence of the wound, or the ill habit of the patient, require the uſe of internal remedies, vulnerary drinks will be found to be of the greateſt conſequence; in compoſing which, the conſtitution of the patient, and the nature of the complaint, ſhould be diligently conſulted; for if the patient is of a phlegmatic habit of body, cold, pale, or naturally ſubject to tumours, then the vulnerary decoction ſhould be compoſed of herbs that attenuate and divide the blood. See the article ATTENUANTS.

If the patient has a thin ſharp blood, then decoctions of viſcous and glutinous plants will be proper; but if he is vexed with great pain or wakefulneſs, then ſome opiates muſt be adminiſtered. See AGGLUTINANTS and OPIATES.

If he ſhould be troubled with an acidity, abſorbents are proper; and when a quickneſs of pulſe and extraordinary heat are perceived, they are ſigns of a ſymptomatical fever. See FEVER.

For the diſorders accompanying wounds, commonly called the ſymptoms of wounds, as hæmorrhages, pains, ſpaſms, convulſions, &c. ſee HÆMORRHAGE, &c.

WOUNDS *in Horſes.* The moſt terrible wounds theſe creatures are ſubject to, are thoſe got in the field of battle. The farriers that attend camps, have a coarſe way of curing theſe; but it is a very expeditious and effectual one.

If the bullet be within reach, they take it out with a pair of forceps; but if it lie too deep to be come at, they leave it behind, and dreſs up the wound in the ſame manner as if it were not there. They firſt drop in ſome varniſh from the end of a feather, and when the bottom is thus wetted with it, they dip a pledget of tow in the ſame varniſh, which they put into the wound, and then cover the whole with the following charge: take a quarter of a pound of powder of bole armenic, half a pound of linſeed oil, and three eggs, ſhells and all; add to theſe, four ounces of bean flour, a quart of vinegar, and five ounces of turpentine; this is all to be mixed over the fire, and the wound covered with it.

This application is to be continued four or five days; then the tent put into the wound is to be dipped in a mixture of turpentine and hogs-lard; by this means a laudable matter will be diſcharged, inſtead of the thin ſharp water that was at firſt. Then the cure is to be completed by dreſſing it with an ointment made of turpentine, firſt well waſhed, and then diſſolved in yolks of eggs, and a little ſaffron added to it.

This is the practice in deep wounds that do not go through the part; but in caſes where the bullet has gone quite through, they take a few weavers linen thrumbs, made very knotty; theſe they make up into a kind of link, and dipping it in varniſh, they draw it through the wound, leaving the ends hanging out at each ſide; by means of theſe they move the link or ſkain three or four times a day, always wetting the new part that is to be drawn into the wound with freſh varniſh.

They put on a charge of bole armenic, &c. as before deſcribed, on each ſide of the wounded part, and continue this as long as the wound diſcharges thin watery matter, or the ſides continue ſwelled. After this, they dreſs it with the ointment of turpentine, yolks of eggs, and ſaffron, till it is perfectly cured.

The other methods are the dreſſing the wound with an ointment made of wax, turpentine, and lard, and covering it with linen rags wetted with cream;

cream; or the dreſſing, with a mixture of yolks of eggs, honey, and ſaffron, and covering it with cream and balm leaves beaten together.

When the wound is ſo dangerous as to require the aſſiſtance of internal medicines, they give the following pills: take aſſa-fœtida, bay-berries, and native cinnabar, of each a pound; beat up the whole into a maſs with brandy, and roll it into pills of fourteen drams weight each. Theſe are to be laid in a ſhady place to dry, after which they will keep a long time without any damage. The horſe is to take two of theſe every other day, or, if neceſſary, every day, till he has taken eight or ten of them; and he is to ſtand bridled two hours before and after taking them.

When the wound ſeems at a ſtand, not appearing foul, and yet not gathering new fleſh, there muſt be recourſe had to the following powder, whoſe effect in bringing new fleſh is wonderful: take dragon's-blood and bole armenic, of each two ounces; maſtic, olibanum, and ſarcocolla, of each three drams; aloes, round birth-wort, and common iris root, of each a dram a half; make the whole into a fine powder. This is ſometimes uſed dry, ſprinkling it on the wound; but ſometimes it is mixed with turpentine, ſometimes with juice of wormwood, and ſometimes with honey of roſes, and either way does very well.

When the wound grows foul, and requires a detergent to cleanſe it, the common liquor for this purpoſe is a phagedenic water, which they make of lime-water and ſublimate in this manner: take two pounds and a half of newly made and unſlacked lime, put it into a pewter veſſel, and pour on it five quarts of boiling water; when the bubbling is over, let it ſtand to reſt two or three days, ſtirring it often with a ſtick: then pour it clear off, after a due time, for the lime to ſettle; and filtre it through ſome whited-brown paper, made for the lining of funnels on this occaſion.

To a quart of clear lime-water thus prepared, add eight ounces of ſpirit of wine, and one ounce of ſpirit of vitriol; when theſe are well mixed by ſhaking them together, then add an ounce of corroſive ſublimate in fine powder: mix all well together, and keep the whole in a bottle to be uſed for cleanſing theſe foul wounds, and on any other occaſion where there may be a detergent of this powerful kind neceſſary. It will keep good many years.

If this water will not thoroughly cleanſe the wound, but there ſtill will remain a quantity of foul matter in it, and there is danger of a gangrene, they add to it as much arſenic, in fine powder, as there was of the corroſive ſublimate; that is, at the rate of an ounce to a quart and half a pint. See GANGRENE.

WRACK, *Fucus*, in botany. See the article FUCUS.

WRACK, or *Ship*-WRACK. See WRECK.

WREATH, in heraldry, a roll of fine linen or ſilk (like that of a Turkiſh turban) conſiſting of the colours borne in the eſcutcheon, placed in an atchievement between the helmet and the creſt, and immediately ſupporting the creſt. See the article CREST, &c.

WRECK, or *Ship*-WRECK, in law, is when a ſhip periſhes on the ſea, and no perſon eſcapes alive out of it. In this caſe, if the ſhip ſo periſhed, or any part thereof, or the goods of the ſhip come to the land of any lord, and are left there, the lord ſhall have the ſame, as being a wreck of the ſea: but if any ſingle perſon, or even a dog, or other living creature, eſcape alive out of the ſhip, the party to whom the goods belong, may come within a year and a day, and proving the goods to be his, he ſhall have them again. And it is held, that they are no wrecks ſo long as they remain at ſea, within the juriſdiction of the admiralty.

It is enacted by 12 Ann. c. 18. that if any wreck happen by any fault or negligence of maſter or mariners, the maſter muſt make good the loſs; but if the ſame was occaſioned by tempeſt, enemies, &c. he ſhall be excuſed: making holes in ſhips, or doing any thing wilfully tending to the loſs thereof, is by that ſtatute declared felony.

WRECK, in metallurgy, a veſſel in which the third waſhing is given to the ores of metals.

WREN, in ornithology, the cheſnut-coloured motacilla, with the wings variegated with white and grey. See MOTACILLA.

WRESTLING, a kind of combat or engagement between two perſons unarmed, body to body, to prove their ſtrength and dexterity, and try which can throw his opponent to the ground.

It was the cuſtom for the Athletæ to anoint their bodies with oil, to give the leſs hold to their antagoniſt. Lycurgus ordered the Spartan maids to wreſtle in public, quite naked, in order to break them of their too much delicacy and niceneſs, to make them appear more robuſt, and to familiarize the people to ſuch nudities.

WRIST, *Carpus*, in anatomy, a part of the hand, conſiſting of eight ſmall, unequal, and irregular bones, all which taken together, repreſent a ſort of grotto, of an irregular quadrangular figure, and connected principally with the baſis of the radius. See HAND.

WRIST, in the manege. The bridle-wriſt is that of the cavalier's left hand. A horſeman's wriſt and his elbow ſhould be equally raiſed, and the wriſt ſhould be two or three fingers above the pummel of the ſaddle.

WRIT, in law, ſignifies in general the king's precept in writing under ſeal, iſſuing out of ſome court, directed to the ſheriff, or other officer, and commanding ſomething to be done in relation to a ſuit or action, or giving commiſſion to have the ſame done. And, according to Fitzherbert, a writ is

is said to be a formal letter of the king in parchment, sealed with his seal, and directed to some judge, officer, or minister, &c. at the suit of a subject, for the cause briefly expressed, which is to be determined in the proper court according to law.

WRIT *of Assistance*, is a warrant that issues out of the Exchequer, to authorize persons to take a constable, or other public officer, to seize goods or merchandizes prohibited and uncustomed, &c. by virtue of which writ, any person may, in day time, and in the presence of such constable, &c. break open doors, chests, warehouses, and other places, to search for and seize uncustomed goods.

There is also a writ of this name that is used to give possession of land; and likewise for the general assistance of sheriffs, &c.

WRIT *of Inquiry and Damages*, a judicial writ that issues out to a sheriff upon a judgment by default, in action of the case, covenant, trespass, trover, &c. commanding him to summon a jury to enquire what damages the plaintiff hath sustained, occasione præmissorum; and when this is returned with the inquisition, the rule for judgment is given upon it; and if nothing be said to the contrary, judgment is thereupon entered.

WRIT *of Rebellion*, is a writ issuing out of the court of Chancery or Exchequer, against a person who is in contempt for not appearing in one of these courts, &c. See the article COMMISSION *of Rebellion*.

WRITER *of the Tallies*, an officer of the Exchequer, being clerk to the auditor of the receipt, who writes upon the tallies the whole letters of the teller's bill. See the article TALLY.

WRITING, *Scriptura*, the art or act of signifying and conveying our ideas to others, by letters, or characters visible to the eye.

Writing is now chiefly practised among us by means of pen, ink, and paper; though the ancients had other methods.

To write without blacking the fingers, Mr. Boyle directs as follows: prepare the paper with a fine powder made of three parts of calcined copperas, two of galls, and one of gum Arabic; these being fresh mixed, rub them with a hare's foot into the pores of the paper, and write with fair water, and the letters will immediately appear black.

To make new writing appear old, the same author directs to moisten it well with oil of tartar per deliquium, more or less diluted with water, as you desire the ink to appear more or less decayed.

We may write without ink or its materials: for this purpose, take a fine powder of calcined hartshorn, of clean tobacco-pipes (or rather of mutton bones burnt to a perfect whiteness) and rub it upon the paper, and then write with a silver bodkin, or the like.

WRY-NECK, *Jynx*, in ornithology. See JYNX.

WYCH-HOUSE, a house in which salt is boiled. See SALT.

WYDRAUGHT, a water-couse, or water-passage, to carry off the filth of a house; properly a sink, or common sewer. See the articles CLOACA and SEWER.

WYKE, anciently signified a farm, hamlet, or little village.

WYTE, or WITE, in our ancient customs, a pecuniary penalty or mulct.

X.

X A N

X The twenty-ſecond letter of our alphabet, and a double conſonant. It was not uſed by the Hebrews or ancient Greeks; for as it is a compound letter, the ancients, who uſed great ſimplicity in their writings, made uſe of and expreſſed this letter by its component parts *cs*. Neither have the Italians this letter, but expreſs it by *ſſ*.

X begins no word in our language, but ſuch as are of Greek original, and is in few others, but what are of Latin derivation; as, *perplex*, *defluxion*, &c. We often expreſs this ſound by ſingle letters, as *cks*, in *backs*, *necks*; by *ks*, in *books*, *breaks*; by *cc*, in *acceſs*, *accident*; by *ct*, in *action*, *unction*, &c. The Engliſh and French pronounce it like *cs*, or *ks*; the Spaniards, like *c* before *a*, viz. *Alexandro*, as if it were *Alecandro*.

In numerals, it expreſſes 10, whence in old Roman manuſcripts it is uſed for *denarius*; and as ſuch, ſeems to be made of two V's, placed one over the other. When a daſh is added over it, thus, $\bar{X}$, it ſignifies ten thouſand.

XANTHICA, in antiquity, a Macedonian feſtival, ſo called becauſe it was obſerved in the month Xanthus, which, as Suidas tells us, was the ſame with April.

At this time, the army was purified by a ſolemn luſtration, in the following manner: they divided a bitch into two halves, one of which, together with the entrails, was placed upon the right hand, the other upon the left; between theſe the army marched in this order: after the arms of the Macedonian kings, came the firſt part of the army; theſe were followed by the king and his children; after whom went the life-guards, and the reſt of the army. This done, the army was divided into two parts, one of which being ſet in array againſt the other, there followed a ſhort encounter, in imitation of a fight.

XANTHIUM, the leſſer burdock, in botany, a genus of plants, producing male and female flowers; the corolla is compound, uniform, tubuloſe, and

X I M

equal, and diſpoſed in an hemiſpherical form; the partial flower is monopetalous, tubuloſe, funnel-ſhaped, erect, and divided into five ſegments at the limb: the fruit is a dry ovato-oblong berry, bifid at the apex, hairy, and covered with hooked prickles, containing an oblong ſeed, plane on one ſide, and convex on the other.

XERANTHEMUM, the Auſtrian ſneeze-wort, in botany, a genus of plants, whoſe flower is compound and unequal; the corollulæ, which form the diſc, are tubuloſe and hermaphrodite; and a few female quinquifid florets compoſe the radius: there is no pericarpium; but the cup, which is imbricated and cylindric, contains the ſeeds, which are oblong and crowned with hair.

The flowers of theſe plants being gathered when full blown, and properly dried, will continue freſh and beautiful ſeveral months; and by dipping them into various tinctures, they may be ſtained of differen colours. They are propagated by ſowing the ſeeds, either in ſpring or autumn, and afterwards the plants ſhould be ſet where they are intended to blow. See plate XCVI. fig. 6.

XEROPHAGIA, in church-hiſtory, the eating of dried foods: ſo the ancient Chriſtians called certain faſt days, on which they eat nothing but bread and ſalt, and drank only water: ſometimes they added pulſe, herbs, and fruits. This ſort of faſting was obſerved chiefly in the holy week, out of devotion, and not by obligation.

XESTA, an Attic meaſure of capacity. See the article MEASURE.

XIMENIA, in botany, a genus of plants, whoſe flower conſiſts of four oblong petals; the inward ones are piloſe, and the under ones are erect in the tube, and revoluted: the ſtamina are eight erect ſhort filaments, topped with linear obtuſe antheræ: the fruit is an oval drupe, including a roundiſh nut with one cell, which contains a ſmooth kernel of the ſame form.

XIPHIAS, the ſword-fiſh, in ichthyology, a genus of the acanthopterigious claſs of fiſhes. About fifteen feet in length is the ſize of a moderately large one, but it is frequently met with much bigger. See plate XCVI. fig. 4.

XIPHIAS, is alſo a fiery mereor, in form of a ſword. It differs from the acontias in this, that the latter is longer, and more like a dart; and the former ſhorter and broader in the middle.

XIPHION, in botany, a genus of plants, differing from the iris by having a bulbous root and ſubulated leaves; but by Linnæus is claſſed among them. See IRIS.

XIPHOIDES, in anatomy, a cartilage adhering to the ſternum; called alſo cartilago enſiformis. See STERNUM.

XYLO-ALOES, or ALOE-WOOD, in pharmacy, a drug diſtinguiſhed into three ſorts; the calambac, the common lignum aloes, and calambour.

The calambac, or fineſt aloe-wood (called by authors, lignum aloes preſtantiſſimum, and, by the Chineſe, ſukhiang) is the moſt reſinous of all the woods we are acquainted with: it is of a light ſpongy texture, very porous, and its pores ſo filled up with a ſoft and fragrant reſin, that the whole may be preſſed and dented by the fingers like wax, or moulded about by chewing in the mouth, in the manner of maſtic.

This kind, laid on the fire, melts in great parts like reſin, and burns away in a few moments, with a bright flame and perfumed ſmell. Its ſcent, while in the maſs, is very fragrant and agreeable; and its taſte acrid and bitteriſh, but very aromatic and agreeable: it is ſo variable in its colour, that ſome have divided it into three kinds; the one variegated with black and purple; the ſecond, with the ſame black, but with yellowiſh inſtead of purple; and the third, yellow alone, like the yolk of an egg: this laſt is the leaſt ſcented of the three; the ſubſtance, however, in them all, is the ſame in every reſpect, except the colour. It is brought from Cochinchina.

The lignum aloes vulgare, is the ſecond in value. This is of a more denſe and compact texture, and conſequently leſs reſinous than the other: there is ſome of it, however, that is ſpongy, and has the holes filled up with the right reſinous matter; and all of it, when good, has veins of the ſame reſin in it.

We meet with it in ſmall fragments, which have been cut and ſplit from larger; theſe are of a tolerably denſe texture, in the more ſolid pieces, and of a duſky brown colour, variegated with reſinous black veins. It is in this ſtate very heavy, and leſs fragrant than in thoſe pieces which ſhew a multitude of little holes, filled up with the ſame blackiſh matter that forms the veins in others. The woody part of theſe laſt pieces is ſomewhat darker than the other, and is not unfrequently purpliſh, or even blackiſh. The ſmell of the common aloe-wood is very agreeable, but not ſo ſtrongly perfumed as the former. Its taſte is ſomewhat bitter and acrid, but very aromatic. This is alſo brought from Cochinchina, and ſometimes from Sumatra.

The calambour, or, as ſome write it, the calambouc, is alſo called agallochum ſylveſtre, and lignum aloes Mexicanum. It is a light and friable wood, of a duſky and often mottled colour, between a duſky green black, and a deep brown. Its ſmell is fragrant and agreeable, but much leſs ſweet than that of either of the others; and its taſte bitteriſh, but not ſo much acrid or aromatic as either of the two former. We meet with this very frequently, and in large logs; and theſe ſometimes entire, ſometimes only the heart of the tree, the cortical part being ſeparated. This is brought from the iſland of Timor, and is the aloe-wood uſed by the cabinet-makers and inlayers.

The Indians uſe the calambac by way of incenſe, burning ſmall pieces of it in the temples of their gods; and ſometimes their great people burn it in their houſes, in times of feaſting.

It is eſteemed a cordial, taken inwardly; and they ſometimes give it in diſorders of the ſtomach and bowels, and to deſtroy worms. A very fragrant oil may be procured from it, by diſtillation, which is recommended in paralytic caſes, from five to fifteen drops. It is at preſent, however, but little uſed, and would ſcarce be met with any where in the ſhops, but that it is an ingredient in ſome of the old compoſitions.

XYLO-BALSAMUM, a name which naturaliſts give to the wood of the tree which yields that precious gum known to the Latins by the name of opobalſamum, and to us by the name of balm of Gilead.

We have branches of this tree brought from Cairo; they are very ſtraight, brittle, unequal, and full of knots; their bark is reddiſh without, and greeniſh within.

The xylo-balſamum is reputed good to ſtrengthen the brain and ſtomach, and to expel poiſon. See BALSAM.

XYLO-CASIA, in the materia medica, the ſame with the caſſia-ligna. See CASSIA.

XYLON, in botany, a name uſed by ſome authors for the bombax of Linnæus. See the article BOMBAX.

XYLOPIA, in botany, a genus of plants, whoſe flower conſiſts of ſix ſeſſile, linear, lanceolated, coriaceous petals, the three outward ones being larger: the ſtamina have no filaments, but conſiſt of numerous antheræ ſitting on the germen: the fruit is a dry, roundiſh, unilocular drupe, containing a roundiſh kernel.

XYRIS, in botany, a genus of plants, whoſe flower

flower conſiſts of three plane, patent, large, crenated petals, with narrow ungues the length of the cup: the ſtamina are three ſlender filaments, ſhorter than the corolla, and topped with oblong erect antheræ: the fruit is a roundiſh trilocular capſule, opening with three valves, and contains a great number of very ſmall ſeeds. See plate XCVI. fig. 3.

XYSTARCHA, in antiquity, the maſter and director of the xyſtus.

In the Greek gymnaſium, the xyſtarcha was the ſecond officer, and the gymnaſiarcha the firſt; the former was his lieutenant, and preſided over the two xyſti, and all exerciſes of the athletæ therein. See the next article.

XYSTUS, among the Greeks, was a long portico, open or covered at the top, where the athletæ practiſed wreſtling and running: the gladiators who practiſed therein, were called xyſtici.

Among the Romans, the xyſtus was only an alley, or double row of trees, meeting like an arbour, and forming a ſhade to walk under.

Y.

Y The twenty-third letter of our alphabet; its ſound is formed by expreſſing the breath with a ſudden expanſion of the lips from that configuration by which we expreſs the vowel *u*. It is one of the ambigenial letters, being a conſonant in the beginning of words, and placed before all vowels, as in *yard*, *yield*, &c. but before no conſonant. At the end of words it is a vowel, and is ſubſtituted for the ſound of *i*, as in *try*, *deſcry*. In the middle of words it is not uſed ſo frequently as *i* is, unleſs in words derived from the Greek, as in *chyle*, *empyreal*; though it is admitted into the middle of ſome pure Engliſh words, as in *dying*, *flying*, &c.

The Romans had no capital of this letter, but uſed the ſmall one in the beginning and laſt ſyllables of words, as in *martyr*, *onyx*.

Y is alſo a numeral, ſignifying 150, or, according to Baronius, 159; and, with a daſh over it, thus, $\overline{Y}$, it ſignified 150,000.

YACHT, or YATCH, a veſſel with one deck, carrying from four to twelve guns. See SHIP.

YAM, in botany, a ſpecies of dioſcorea. See the article DIOSCOREA.

This plant is much cultivated in the Weſt-Indies: the root is the ſize of a man's leg, of an irregular form, and of a dirty brown colour on the outſide, but when cut, is white and mealy within.

The ſtalks of this plant are triangular and winged; the leaves are heart-ſhaped; the ſtalks climb to the height of ten or twelve feet, when they grow near trees or ſhrubs, to which they faſten themſelves, otherwiſe they trail on the ground.

Yams are propagated by cutting the root into pieces, obſerving to preſerve an eye or bud to each, as is practiſed in planting potatoes; each piece being planted will grow, and produce three or four large roots. In America, they are ſix or eight months in the ground before the roots are taken up for uſe. Theſe roots are roaſted or boiled, and eaten by the inhabitants, and ſometimes made into bread.

This plant cannot be preſerved in this country without the aid of a hot-houſe, on account of its tenderneſs and ſuſceptibility of cold.

YARD,

YARD, a measure of length used in England and Spain. See MEASURE.

YARD, in anatomy. See the article PENIS.

YARD-ARM, is that half of the yard that is on either side of the mast, when it lies athwart the ship.

YARD-LAND, is taken to signify a certain quantity of land, in some counties being fifteen acres, and in others twenty; in some twenty-four, and in others thirty and forty acres.

YARDS *of a Ship*, are those long pieces of timber which are made a little tapering at each end, and are fitted each athwart its proper mast, with the sails made fast to them, so as to be hoisted up, or lowered down, as occasion serves. See SHIP.

YARE, among sailors, implies ready, or quick. It is sometimes also used by seamen for bright.

YARN, wool or flax, spun into thread, of which they weave cloth. See CLOTH, WOOL, &c.

YARRINGLE, a kind of instrument, or reel, on which hanks of yarn are wound, to clues or balls. See REEL.

YARROW, *Achillea*, in botany. See the article ACHILLEA.

YAWNING, *Oscitatio*, an involuntary opening of the mouth, occasioned by a vapour, or ventosity, endeavouring to escape, and generally witnessing an irksome weariness, or an inclination to sleep.

Yawning, according to Boerhaave, is performed by expanding, at one and the same time, all the muscles capable of spontaneous motion; by greatly extending the lungs; by drawing in gradually and slowly a large quantity of air, and gradually and slowly breathing it out, after it has been retained for some time, and rarified, and then restoring the muscles to their natural state. Hence, the effect of yawning is to move, accelerate, and equally distribute all the humours through all the vessels of the body, and, consequently, to qualify the muscles and organs of sensation for their various functions.

Sanctorius observes, that a great deal is insensibly discharged, when nature endeavours to get rid of the retained perspirable matter, by yawning and stretching of the limbs. To these a person is most inclined just after sleep, because a greater quantity going off by the pores of the skin, than at other times, whensoever a person wakes, the increased contraction that then happens, closes a great deal of the perspirable matter in the cutaneous passages, which will continually give such irritations, as excite yawning and stretching; and such motions, by shaking the membranes of the whole body, and shifting the contacts of their fibres and the inclosed matter, by degrees throw it off. Hence we see the reason, why healthful strong people are most inclined to such motions, because they perspire most in time of sleep, and therefore have more of the perspirable matter to lodge in the pores, and greater irritations thereunto.

YAWS, in the sea-language. A ship is said to make yaws when she does not steer steady, but goes in and out when there is a stiff gale.

YAWS, a distemper endemial to Guinea and the hotter climates in Africa.

It makes its first appearance in little spots on the cuticle, not bigger than a pin's point, which increase daily, and become protuberant, like pimples. Soon after, the cuticle frets off; and then, instead of pus or ichor, there appears white sloughs or sordes, under which is a small red fungus. These increase gradually, some to the size of a small wood-strawberry, others to that of a raspberry, others again exceed the largest mulberry, which in shape they very much resemble. In the mean time, the black hair growing in the yaws turns to a transparent white. See the articles CUTICLE, &c.

It is not easy to determine the exact time which the yaws take in going through their different stages. Lusty well-fed negroes have had several yaws as big as a mulberry in a month's time; whereas the low in flesh, with a scanty allowance, have passed three months without their growing to the size of a strawberry.

They appear in all parts of the body, but are most plentiful, and of the largest size, about the groin, privy parts, anus, arm-pits, and face; they are largest when fewest in number, and vice versa. They are not painful, unless handled roughly, nor cause a loss of appetite. They continue long without any sensible alteration; and some are of opinion, that as soon as the funguses become dry, the infection is exhausted.

The yaws are not dangerous, if the cure is skilfully managed at a proper time. But if the patient has been once salivated, or has taken any quantity of mercury, and his skin once cleared thereby, the cure will be very difficult, if not impracticable. The following form of medicine is recommended as a cure: take of flowers of sulphur, one scruple; of camphor dissolved in spirit of wine, five grains; of theriaca andromachi, one dram; and as much of syrup of saffron as will make a bolus. Let the bolus be taken at going to rest, which must be repeated for a fortnight or three week, till the yaws come to the height. Then throw the patient into a gentle salivation, with calomel given in small doses, without farther preparation. After salivation, sweat the patient twice or thrice, on a frame or chair, with spirit of wine, and give the following electuary: of æthiops mineral, one ounce and a half; of gum guaiacum, half an ounce; theriaca andromachi, and conserve of red roses, of each one ounce; oil of sassafras, twenty drops; and as much of syrup of saffron as is requisite for an electuary. Of this, let two drams be taken in the morning and at night. He may likewise drink the decoction of guaiacum and sassafras fermented with molasses, for his constant drink, while the electuary is taking, and a week or a fortnight after the electuary is spent.

Some-

Sometimes there remains one large yaw, high and knobbed, red and moiſt; this is called the maſter-yaw. This muſt be conſumed an eighth or a tenth part of an inch below the ſkin, with corroſive red mercury, and burnt alum, of each an equal quantity, and digeſted with one ounce of yellow baſilicon, and one dram of red corroſive mercury; and cicatrized with lint preſſed out of ſpirit of wine, and with the vitriol-ſtone. See FUNGUS and CICATRIX.

YEAR, *Annus*, the time the ſun takes to go through the twelve ſigns of the zodiac. This is properly the natural or tropical year, and contains 365 days, 5 hours, and 49 minutes. See the articles SIGN and ZODIAC.

As for the Gregorian, the civil, the ſolar or aſtronomical, the biſextile, and Platonic years, ſee them under the articles GREGORIAN, CIVIL, &c.

The Julian year derives both its name and inſtitution from Julius Cæſar the dictator; for before his time the form of the Roman year was ſo corrupted by the indiſcretion of the pontiffs, in whoſe hands the power of intercalation was lodged, that the winter-months fell back to the autumn, and thoſe of autumn to the ſummer. To remedy theſe inconveniences, the dictator not only added to that year (in which he ſet about the reformation of the calendar) the common intercalation of 23 days, between the 23d and 24th days of February, purſuant to Numa Pompilius's inſtitution, but likewiſe 67 days more between November and December, ſo that this year contained 445 days. This done, he inſtituted a ſolar year, of 365 days and 6 hours, purſuant to what he had learned from the Egyptians, and every fourth year he ordered a day to be added.

The Arabs, Saracens, and Turks, count their year by the motion of the moon, making it conſiſt of 12 moons, or months; whereof ſome have 30, and ſome 29 days, alternately; and theſe altogether make 354 days, and conſtitute a common lunar year: and 354 days, 8 hours, 48 minutes, 38 ſeconds, 12 thirds, conſtitute what is called a lunar aſtronomical year.

The Greeks counted their year by the motion of both ſun and moon; and finding that there was 11 days difference between the lunar and ſolar years, at firſt they added an intercalary month every two years, containing 22 days. Afterwards, conſidering the 6 hours alſo, they put their emboliſm off 4 years, and then making the 3 firſt years to contain 354 days each, this made the fourth year to have 399 days: and to make this intercalation the more remarkable, they inſtituted the Olympic games on every ſuch fourth year; whence came the computation by Olympiads. See OLYMPIAD.

The Egyptians had two ſorts of years, the erratic and the fixed, or actiac. The erratic was called the Nabonaſſarean, from the epocha which takes its riſe from Nabonaſſar, king of the Chaldees. As it neglects the 6 hours, which, in the Julian form, make a leap-day once in four years, its beginning anticipates the Julian every fourth year by a day, and therefore it is juſtly called erratic.

The anticipation of 1 day in 4 years, gains of the Julian years 1 in 1460; ſo that 1461 Nabonaſſarean years make but 1460 Julian years.

The fixed Egyptian year obſerves the Julian form of 365 days and 6 hours, making a leap-day of the 6 hours once in 4 years. It differs from the Julian in this, that its months are the ſame with thoſe of the Nabonaſſarean; that it begins on Auguſt 29, inſtead of January 1, or, on Auguſt 30, if it be a leap-year; that it takes in the leap-day, not in February, but at the end of the year. See EPOCHA and INTERCALARY.

The Perſian erratic year goes by the name Yezdegerdic, by reaſon that the Perſian epocha commences from the death of Yezdegird, the laſt Perſian king, who was killed by the Saracens. It conſiſts of 12 months, containing 30 days each, and 5 ſupernumerary ones; ſo that it differs from the Nabonaſſarean only in the names of the months, and the commencement of the epocha.

The Gelalean year, uſed alſo by the Perſians, is very well adapted to the ſolar motions. It takes in a leap-day every fourth year, but every ſixth or ſeventh turn it throws it forward to the fifth year, by which means the equinoxes and ſolſtices are fixed to almoſt the ſame days of the month.

The Syriac year conſiſts of 365 days and 6 hours, being divided into 12 months of equal extent with thoſe of the Julian year, to which they correſpond. This year begins October 1, ſo that the month called Tiſhrim, agrees with our October. The aſtronomical year is two-fold, viz. the tropical and ſidereal: by the latter, is meant that ſpace of time which the ſun takes in departing from a fixed ſtar, and returning to the ſame again. This year conſiſts of 365 days, 6 hours, and 10 minutes.

As the form of the year is various among different nations, ſo likewiſe is the beginning: the Jews began their eccleſiaſtical year with the new moon of that month whoſe full moon happens next after the vernal equinox; and every ſeventh year they kept as a ſabbatic year, during which they let their land lie at reſt. The ancient Jewiſh year was made to agree with the ſolar year, by the adding of 11, and ſometimes of 12 days, at the end of the year, or by an emboliſmic month.

The beginning of the Athenian or Attic year, was reckoned from that new moon, the full moon of which comes next after the ſummer ſolſtice.

The Macedonian lunar year agrees with the Athenian, excepting that the former takes its beginning, not from the ſummer-ſolſtice, but from the autumnal equinox.

The Ethiopic year is a ſolar year, agreeing with the

the actiac or fixed Egyptian year, except in this, that the names of the months are different, and that it commences with the Egyptian year, on Auguſt 29 of the Julian year.

The Arabian or Mahometan year is called alſo that of the hegira, becauſe the calculation of theſe years runs from the epocha of the hegira, when Mahomet fled from Mecca to Medina. They had 12 civil months in a year, which contained 29 and 30 days, by turns, abating for their leap-years, in which the month Dulheggia has always 30. See HEGIRA.

The Mahometans begin their year when the ſun enters Aries; the Perſians, in the month anſwering to our June; the Chineſe, and moſt of the Indians, begin it with the firſt moon in March.

At Rome, there are two ways of computing the year, the one beginning at the nativity of our Lord, which the notaries uſe; the other in March, on occaſion of the incarnation, and it is from this the bulls are dated.

In England, the civil or legal year, as well as the hiſtorical year, commences January 1, by the late act for the alteration of the ſtyle. The church, as to her ſolemn ſervice, begins the year on the firſt Sunday in Advent, which is always that next St. Andrew's day.

YEAR *and* DAY, in law, ſignifies a certain time that by law determines a right, or works preſcription in divers caſes; as in the caſe of an eſtray, if the owner do not challenge it within that time, it becomes forfeited to the lord; ſo of a wreck, &c. The like time is given to proſecute appeals in; and where a perſon wounded, dies in a year and a day after the wound received, it makes the offender guilty of murder. See ESTRAY, &c.

There is alſo year and day and waſte, which is taken to be part of the king's prerogative, whereby he challenges the profits of the lands and tenements for a year and a day, of thoſe that are attainted of petty treaſon or felony; and the king may cauſe waſte to be made on the lands, &c. by deſtroying the houſes, ploughing up the meadows and paſtures, rooting up the woods, &c. unleſs the lord of the fee agrees with him for the redemption of ſuch waſte.

YELLOW, one of the original colours of light. See COLOUR and LIGHT.

YELLOW, in dyeing, is one of the five ſimple and mother colours. See COLOUR and DYEING.

YELLOWS, a diſeaſe in a horſe, much the ſame with that called the jaundice in man.

There are two kinds of it, the yellow and the black. The yellow is a very frequent diſorder, ſay the farriers, ariſing from obſtructions in the gall-pipe, or the little ducts opening into the ſame, occaſioned by viſcid or gritty matter lodged therein, or a plenitude and compreſſion of the neighbouring blood-veſſels, by means whereof the matter that ſhould be turned into gall, is taken up by the vein and carried into the maſs of blood, which it tinctures yellow, ſo that the eyes, inſide of the lips, and other parts of the mouth capable of ſhewing the colour, appear yellow. The effect whereof is, that a horſe will be dull, heavy, and low-ſpirited, eaſily jaded by the leaſt labour or exerciſe, &c.

The black is known by other ſymptoms: the whites of the eyes, mouth, and lips, turn to a duſky colour, and not ſo clear and ſanguine as before.

For the cure of this diſeaſe, we are directed to diſſolve an ounce of mithridate in a quart of ale, or beer, and to give to the horſe lukewarm; or inſtead of mithridate, two ounces of Venice-treacle; and if that is not to be had, three ſpoonfuls of common treacle.

This diſtemper is alſo incident to black cattle. The cure is, to bleed them in the ears, eyes, and tail; to put ſalt into their ears, and to rub them between your hands: and when blooded, give them two handfuls of ſalt down their throats, dry over night. In the morning, let them have fenugreek, turmeric, long-pepper, anniſe-ſeed, and liquorice, but two penny-worth in all, made into a powder, and given in a quart of ale, milk-warm.

YELLOW-HAMMER, in ornithology, a ſpecies of frangilla, with a yellow head and a greyiſh yellow body. See FRANGILLA.

YEOMAN, the firſt or higheſt degree among the plebeians of England, next in order to the gentry. The yeomen are preperly freeholders, who having land of their own, live on good huſbandry.

YEOMAN, is alſo a title of office in the king's houſhold, of a middle place or rank between an uſher and a groom.

YEOMEN *of the Guard*, were antiently two hundred and fifty men of the beſt rank under gentry, and of larger ſtature than ordinary, each being required to be ſix feet high. At preſent there are but one hundred yeomen in conſtant duty, and ſeventy more not in duty; and as any of the hundred dies, his place is ſupplied out of the ſeventy.

They go dreſſed after the manner of Henry VIII's time. They formerly had diet as well as wages, when in waiting, but this was taken off in the reign of queen Anne.

YEST, YEAST, or BARM, a head or ſcum riſing upon beer or ale, while working or fermenting in the vat. It is uſed for a leven or ferment, in the baking of bread, as ſerving to ſwell or puff it up very conſiderably in a little time, and to make it much lighter, ſofter, and more delicate. When there is too much of it, it renders the bread bitter.

The faculty of medicine of Paris, by a decree of March 24, 1688, ſolemnly maintained it noxious to the health of the people: yet could not that prevent its progreſs. See BAKING and BREAD.

YEW-TREE, *Taxus*, in botany. See TAXUS.

YEW, is alſo a term uſed by the ſalt-workers of Limington, and ſome other parts of England, to expreſs

expreſs the firſt riſing of a ſcum upon the brine in boiling. See the article SALT.

YOAK, or YOKE, in agriculture, a frame of wood, fitted over the necks of oxen, whereby they are coupled together, and harneſſed to the plough.

The Romans made the enemies they ſubdued, paſs under the yoke, which they called, ſub jugam mittere; that is, they made them paſs under a ſort of furcæ patibulares, or gallows, conſiſting of a pike, or other weapon, laid acroſs two others planted upright in the ground. See FURCA.

YOAK *of Land*, in our ancient cuſtoms, was the ſpace which a yoak of oxen (that is, two oxen) may plow in a day.

Sea-YOAK. When the ſea is ſo rough that the helm cannot be governed by the hands, the ſeamen make a yoak to ſteer by, that is, they fix two blocks to the end of the helm, and reeving two ſmall ropes through them, which they call falls, by having ſome men at each tackle, they govern the helm by direction. They have another way of making a ſea-yoak, by taking a double turn about the end of the helm with a ſingle rope, the ends being laid to the ſhip's ſides, by means whereof they guide the helm. See the article HELM.

YOLK, or YELK, *Vitellus*, the yellow part in the middle of an egg. See EGG.

YPSILOIDES, in anatomy, the third genuine ſuture of the cranium, thus called from its reſembling a Greek υ, or ypſilon.

YUCCA, in botany, a genus of plants, whoſe flower is campanulated and divided into ſix large ovate petals, cohering at their baſe: the ſtamina are ſix ſhort filaments, topped with ſmall antheræ: the fruit is an oblong trifid capſule, obtuſely triangular, and divided into three cells, which contain many ſeeds laying over each other in a double order.

The yucca has much the appearance of the aloe, and is propagated in the ſame manner; and from the dried root of a ſpecies, a kind of bread is made by the Indians.

Z

Z, The twenty-fourth and laſt letter, and the nineteenth conſonant of our alphabet; the ſound of which is formed by a motion of the tongue from the palate downwards and upwards to it again, with a ſhutting and opening of the teeth at the ſame time.

This letter has been reputed a double conſonant, having the ſound *ds*; but ſome think with very little reaſon; and, as if we thought otherwiſe, we often double it, as in *puzzle*, *muzzle*, &c.

Among the ancients, Z was a numeral letter, ſignifying two thouſand; and with a daſh added at top, $\bar{Z}$, ſignified two thouſand times two thouſand, or four millions.

In abbreviations, this letter formerly ſtood as a mark for ſeveral ſorts of weights; ſometimes it ſignified an ounce and a half, and very frequently it ſtood for half an ounce; ſometimes for the eighth part of an ounce, or a dram troy weight; and it was in earlier times uſed to expreſs the third part of one ounce, or eight ſcruples. ZZ were uſed by ſome of the ancient phyſicians to expreſs myrrh, and at preſent they are often uſed to ſignify zinziber, or ginger.

ZA-

ZACINTHA, in botany, Vaillant's name for a ſpecies of lapſana. See the article LAPSANA.

ZAFFER, or ZAFFRE, in chemiſtry, the name of a blue ſubſtance, of the hardneſs and form of a ſtone; and generally ſuppoſed to be a native foſſil.

It is in reality, however, a preparation of cobalt; the calx of that mineral being mixed with powdered flints, and wetted with water to bring it into this form. See the article COBALT.

ZANNICHELLIA, in botany, a genus of plants, producing male and female flowers; the male flower hath neither cup or corolla, conſiſting only of a long, erect, ſingle filament, topped with an ovate anthera; the female flower, which is placed near the filament, has no corolla, but conſiſts of a monophyllous ventricoſe cup, which is ſcarce viſible, and four corniculated germina, which join together, and afterwards become the ſame number of oblong ſeeds, which are acuminated on both ſides.

ZANONIA, in botany, a genus producing male and female flowers on diſtinct plants; the male flower is monopetalous, and divided into three pointed inflexed ſegments, with five patent ſtamina; the corolla of the female flower is like that of the male, and the fruit is a long, very large, truncated berry, attenuated at the baſe; it contains three cells, in each of which are placed two ſeeds, of an oblong-roundiſh figure.

ZANTHOXYLUM, in botany, a genus producing male and female flowers on diſtinct trees; they are both deſtitute of petals; the cup is divided into five oval, erect, coloured ſegments; the ſtamina are five ſubulated filaments, topped with twin antheræ, which are furrowed: the fruit, which ſucceeds the female flower, is an oblong unilocular capſule, containing a ſmooth roundiſh ſeed.

ZEA, Indian corn, in botany, a genus of plants, producing male and female flowers in ſpikes; the corolla of the male flower is a bivalvular glume, with two compreſſed very ſhort nectaria: the ſtamina are three capillary filaments, topped with quadrangular antheræ; the corolla of the female flower conſiſts of two membranaceous, broad, perſiſtent valves: there is no pericarpium; but the ſeeds, which are roundiſh and compreſſed, are half incloſed in a large long receptacle.

This corn is ground to flour, and the pooreſt ſort of people in America, Italy, and Germany, make their bread with it, and in ſome countries dreſs the ſpikes different ways: but this grain ſeldom agrees with thoſe who have not been accuſtomed to eat it. However, it is a better ſubſtitute than bean-flour, or other ſorts which have, in times of ſcarcity, been uſed in England; and will always be found a hearty food for cattle, hogs, and poultry: ſo that in light ſandy lands, where beans and peas ſucceed not well, this grain may be cultivated to advantage. The ſeaſon for ſowing the ſeed, is the latter end of March, or beginning of April.

ZEAL, ζηλος, the exerciſe of a warm animated affection, or paſſion, for any thing. See the article PASSION.

ZEALOTS, an ancient ſect of the Jews, ſo called from their pretended zeal for God's laws, and the honour of religion. The zealots were a moſt outrageous and ungovernable people; and on pretence of aſſerting God's laws, and a ſtrictneſs and purity of religion, aſſumed a liberty of queſtioning notorious offenders without ſtaying for the ordinary formalities of law.

ZEBLICIUM *Marmor*, in natural hiſtory, a name given by ſeveral authors to a ſoft green marble variegated with black and white; and though the authors who have deſcribed it have not obſerved it, yet it no way differs from the white ophites of the ancients.

ZEBRA, the wild aſs, in zoology, a ſpecies of equus, tranſverſely ſtriated. See the articles HORSE and ASS.

The whole animal is party-coloured, or beautifully ſtriped in a tranſverſe direction, with long and broad ſtreaks, alternately of a deep, gloſſy, and ſhining browniſh and whitiſh, with ſome abſolutely black. It is a native of many parts of the Eaſt. See plate XCVII. fig. 1.

ZECHARIAH, a canonical book of the Old Teſtament, containing the predictions of Zechariah, the ſon of Barachia, and grandſon of Iddo. He is the eleventh of the twelve leſſer prophets.

ZEDOARY, in the materia medica, a root, the ſeveral pieces of which differ ſo much from one another in ſhape, that they have been divided into two kinds, as if two different things, under the names of the long and round zedoary, being only the ſeveral parts of the ſame root.

ZEND, or ZENDAVESTA, a book containing the religion of the magians, or worſhippers of fire, who were diſciples of the famous Zoroaſter.

This book was compoſed by the famous Zoroaſter, during his retirement in a cave, and contained all the pretended revelations of that impoſtor.

ZENITH, in aſtronomy, the vertical point; or a point in the heavens directly over our heads. See the article NADIR.

The zenith is called the pole of the horizon, becauſe it is ninety degrees diſtant from every point of that circle. See the articles POLE and HORIZON.

ZENITH-DISTANCE, is the complement of the meridian altitude of any heavenly object; or it is the remainder, when the meridian altitude is ſubtracted from ninety degrees. See the articles COMPLEMENT and ALTITUDE.

ZENSUS, in arithmetic, a name given to a ſquare number, or the ſecond power, by ſome authors.

ZEPHANIAH, a canonical book of the Old Teſtament, containing the predictions of Zephaniah

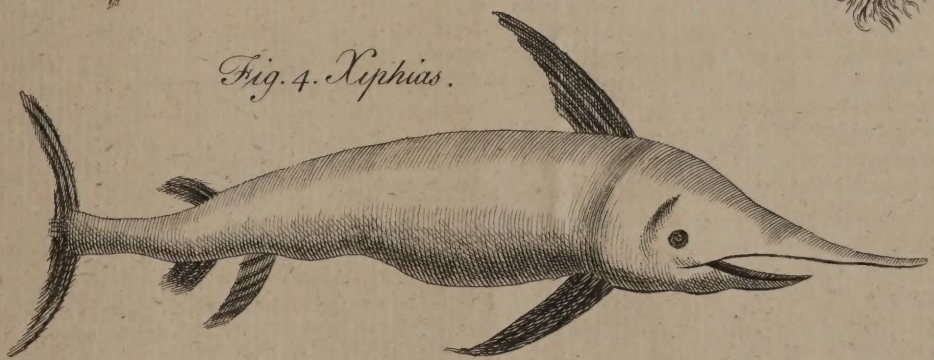
Fig. 1. Zebra.

Fig. 2. Zibethicus.

Fig. 3. Xyris.

Fig. 6. Xeranthemum.

Fig. 4. Xyphias.



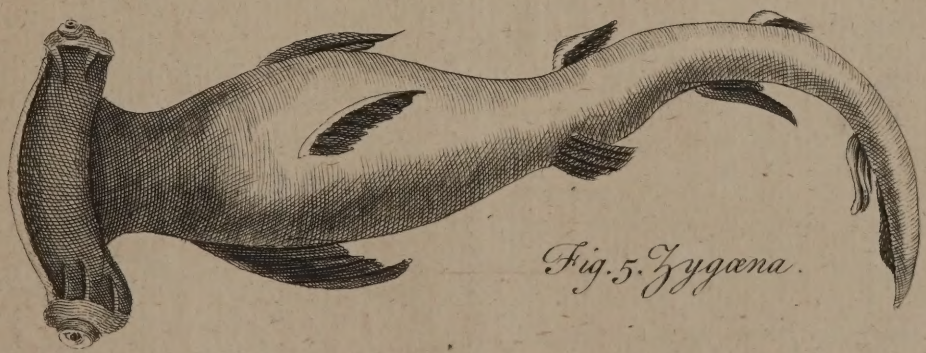


Fig. 5. Zygæna.

T. Lodge sculp.

niah the ſon of Cuſhi, and grandſon of Gedaliah; being the ninth of the twelve leſſer prophets. He propheſied in the time of king Joſiah, a little after the captivity of the ten tribes, and before that of Judah; ſo that he was cotemporary with Jeremiah.

ZEPHYR, *Zephyrus*, the weſt wind; or that which blows from the cardinal point of the horizon oppoſite the eaſt. See the articles WIND, and WEST.

ZEST, the woody thick ſkin, quartering the kernel of a walnut; preſcribed by ſome phyſicians, when dried and taken with white-wine, as a remedy againſt the gravel.

Zeſt is alſo uſed for a chip of orange or lemon-peel; ſuch as is uſually ſqueezed into ale, wine, &c. to give it a flavour; or the fine etherial oil which ſpurts out of that peel on ſqueezing it.

ZETETIC METHOD, in mathematics, the method made uſe of to inveſtigate or ſolve a problem.

ZEUGMA, a figure in grammar, whereby an adjective or verb which agrees with a nearer word, is alſo, by way of ſupplement, referred to another more remote.

ZIBETHICUS, the civet-cat, in zoology; the grey meles, with uniform claws. It was long before the form of this creature, to whom we owe the civet, was known, and long after this before it could be determined to what genus of quadrupeds it belonged: it was firſt ſuppoſed of the cat, and afterwards of the dog-kind; but it is truly one of the badger ſpecies. It is a large and fierce animal; (See plate XCVI. fig. 2.) its ſize is that of the common badger, but its body is not ſo bulky; the head is large, oblong, and conſiderably thick; the forehead is depreſſed; the ſnout is rounded and thick; the noſe turns up a little; the mouth is wide, and is furniſhed in a very formidable manner with teeth; and there are a few rigid but very long whiſkers about it; the eyes are ſmall, the ears large, obtuſe, and patalous; the neck is long, rigid, and thick; the tail long, and reſembling that of the common cat; it is covered with hair, and there runs a ridge of the ſame hair all along the top of the back. The whole animal is of a light ſilvery colour, variegated in a beautiful manner, with large ſpots of black; the legs are very robuſt, almoſt intirely black, the feet are armed with very long and ſharp claws; under the tail is ſituated the bag, in which is contained the perfume we call civet; and its ſituation is the ſame with that which contains the white ſebaceous matter in the badger.

ZIBETHUM, *Civet*. See CIVET.

ZIMENT-WATER, or copper-water, in natural hiſtory, the name by which ſome have called water found in places where there are copper-mines, and lightly impregnated with particles of that metal. See COPPER.

The moſt famous ſpring of this kind is a mile diſtant from Newſol, in Hungary, in a great copper-mine, where the water is found at different depths, and is received into different baſons, for the purpoſe of ſeparating the copper from it. In ſome of theſe it is much more highly ſated with this metal than in others, and will make the ſuppoſed change of iron into that metal much ſooner. The moſt common pieces of iron uſed in the experiments, are horſe-ſhoes, nails, and the like; they are found very little altered in ſhape after the operation, except that their ſurfaces are more raiſed. The water which performs this wonderful operation appears greeniſh in the baſons where it ſtands; but if a glaſs of it be taken up, it looks clear as cryſtal; it has no ſmell, but has a very ſtrong vitriolic and aſtringent taſte, inſomuch, that the lips and tongue are bliſtered and ſcorched on taſting it. The miners uſe this water as a medicine; and whatever ſickneſs they are ſeized with, they firſt attempt its cure with large doſes of this water, which uſually both vomits and purges them briſkly; they alſo uſe it in diſorders of the eyes. The copper produced from theſe waters is valued by the people much beyond any other copper, as being more ductile, and running eaſier in the fire. And from the ſeveral experiments made upon the water, the true nature of it may be eaſily underſtood. It contains a large quantity of the vitriol of copper, which it probably owes to a ſolution of that metal, by means of the acid of the common pyrites and water. When this is known, the effects are not difficult to be accounted for; there being no real change of one metal into another, but the true ſtate of the caſe being that the particles of one metal are diſſolved and carried away, and thoſe of another metal depoſited in their place; a water thus impregnated is a menſtruum capable of diſſolving iron, and in the ſolution of that metal becomes ſo weakened as to let go the copper it before contained in ſmall parcels.

ZINC, or ZINK. See the article ZINK.

ZINK, ZINC, or ZINCK, in natural hiſtory, the name of a very remarkable foſſil ſubſtance, reſembling biſmuth in appearance, but of a bluer colour. See the article BISMUTH.

It is a very remarkable mineral, and one that has never been well underſtood as to its origin, till of late; for though the world well knew of a long time both zink and lapis calaminaris, and knew that both of them had the remarkable property of turning copper into braſs, which one would think might have given a hint to the diſcovery of a natural alliance between them; yet have they been ever treated of as two different ſubſtances, by the writers on theſe ſubjects; and Dr. Lawſon was the firſt who ever publickly declared, and proved, lapis calaminaris to be the ore of zink. See the article CALAMINARIS *Lapis*.

Zink is generally confounded with biſmuth, tho' in reality a very different body; but the regulus of theſe two minerals having a very great external reſemblance, the vulgar have not diſtinguiſhed them; and hence we hear of many ores of zink in the leſs accurate writers, all which are truly the ores of biſmuth.

The lapis calaminaris is the true and general ore of zink, yet that mineral is not confined to this ore alone, but is mixed in great abundance in its diſſeminated particles among the matter of the ores of other metals, particularly of lead.

Our artificers have long been acquainted with zink, under the name of ſpelter; but none of them till of late have ever been able to make any gueſs as to its origin. We have much zink brought to to us from the Eaſt-Indies, under the name of tutenag; yet no body ever knew from what, or how it was produced there; and all that was heretofore known of it was, that among that ſtrange mixture of ores which the great mines yield at Goſſelaer in Saxony, when they were fuſed for other metals, a large quantity of zink was produced; but Dr. Lawſon obſerving, that the flowers of zink and of lapis calaminaris were the ſame, and that their effects on copper were the ſame, never ceaſed his inquiries till he found out the method of ſeparating zink from it.

The pure zink is a ſolid metal-like body, of a bluiſh white, and ſomewhat leſs brittle than biſmuth, eſpecially when gently heated, and moſt, of all the metallic minerals, approaches to malleability: it melts in a very ſmall fire, and in a ſtrong one takes fire, burning with a bluiſh-green flame, and ſubliming into white flowers, which are with difficulty reducible again into the form of zink: in an open fierce fire, it wholly flies off in vapour.

There is great reaſon to believe, that all the zink or tutenag brought from the Eaſt-Indies, is procured from calamine; and we have now on foot at home, a work eſtabliſhed by the diſcoverer of this ore, which will probably make it very ſoon unneceſſary to bring any zink into England, as we have great plenty of the calamine.

The manner of extracting zink from the lapis calaminaris, is this: the lapis calaminaris muſt be finely pulverized, and well mixed with an eighth part of charcoal-duſt, and put into a cloſe retort to prevent the acceſs of air, which would inflame the zink as it riſes. The retort is to be placed on a violent fire, ſufficient to melt copper. After ſome time the zink riſes, and appears in the form of metallic drops within the neck of the retort. When the veſſel is cool, it muſt be taken out, by breaking off the neck of the retort.

Flowers of ZINK. The flowers of zink are a ſubſtance famous in the writings of the chemiſts, who have led their followers into a thouſand errors by the names by which they have called them. Some have called them talc, and a ſolution of them in vinegar, oil of talc; to which they have attributed very extraordinary qualities. Some have ſet the ignorant upon a fruitleſs attempt of extracting an oil from Venetian talc, to do all the things they have commemorated of this oil. Others have called theſe flowers the ſericum: others the aqua ſicca philoſophorum; and others the philoſophic cotton.

The moſt ſimple and eaſy way of obtaining the flowers of zink pure and white, is this: melt the zink in a tall crucible inclined in the furnace in an angle of 45 degrees, or thereabouts; let the fire be moderate, little ſtronger than would be neceſſary for the melting of lead. If the zink is left in this ſtate without being ſtirred, it forms a grey cruſt upon its ſurface, and becomes calcined by degrees under it into a granuloſe white ſubſtance; but to have the flowers, the matter muſt be ſtirred from time to time with an iron rod, and this cruſt broken as often as it ariſes; there will then, after ſome time, appear a bright white flame, and about two inches above it there will be found a very thick ſmoak, and with this there will ariſe a quantity of very white flowers, which will fix themſelves to the ſides of the crucible in the form of fine cotton.

The flowers are to be ſeparated at times, and by careful management there may be collected from the zink a greater weight of flowers than its own weight, when put into the fire. In working four pounds of zink in this manner, there will be only about an ounce of a calcined earthy matter left at the bottom of the crucible, and the quantity of flowers will be about two drams and a half in each pound, more than the quantity of zink; beſides that, it is eaſy to conceive from the manner of making them, that a great quantity muſt have been carried away with the ſmoak. And this is not to be prevented, ſince, if the veſſel be cloſed to keep in the fumes, the external air being denied free acceſs, the ſublimation immediately ceaſes, and no more flowers can be obtained, till the veſſel is again opened, and the air admitted.

The fumes of zink have a ſtrong ſmell of garlic, and are very noxious to the lungs. The reducing zink into theſe flowers, is the deſtroying it abſolutely as to its metallic form; for none of the methods uſed by chemiſts to bring back metals to their original ſtate, are able to bring theſe flowers to zink again.

ZINNIA, in botany, a genus of plants, producing compound radiated flowers; the female florets form the rays, and the hermaphrodite ones compoſe the diſc; theſe are numerous and elevated. The female are roundiſh, ligulated, and perſiſtent; the cup is oblong and imbricated, and contains the ſeeds, which are oblong and horned.

ZINZIBER, or ZINGIBER, ginger, in botany, the

the naked ſtalked oval ſpiked amomum. See the articles AMOMUM and GINGER.

ZIZANIA, in botany, a genus of plants, the male corolla whereof is a glume formed of two valves; the female corolla is a glume formed of a ſingle valve, of a cuculated form, and terminated by an ariſta or awn; there is no calyx in either the male or female flowers; the ſeed is ſingle, and placed in the bottom of the corolla, which opens horizontally to let it out.

ZIZIPHORA, field-baſil, in botany, a genus of plants, whoſe flower is monopetalous and ringent; the tube is cylindric, the length of the cup; the limb is very ſmall; the upper lip is ovate, reflexed, and intire; and the lower lip is broad, patent, and trifid: the ſtamina are two ſpreading filaments, topped with oblong antheræ; there is no pericarpium, but the cup contains four ſeeds, which are oblong and obtuſe, gibbous on one ſide, and angular on the other.

ZODIAC, *Zodiacus*, in aſtronomy, a faſcia or broad circle, whoſe middle is the ecliptic, and its extremes two circles, parallel thereto, at ſuch a diſtance from it, as to bound or comprehend the excurſions of the ſun and planets.

The ſun never deviates from the middle of the zodiac, i. e. from the ecliptic, but the planets all do more or leſs. Their greateſt deviations, called latitudes, are the meaſure of the breadth of the zodiac, which is broader or narrower, as the greateſt latitude of the planets is made more or leſs; accordingly, ſome make it ſixteen, ſome eighteen, and ſome twenty degrees broad.

The zodiac, cutting the equator obliquely, makes an angle therewith of $23\frac{1}{2}°$, or more preciſely of 23° 29′, which is what we call the obliquity of the zodiac, and is the ſun's greateſt declination.

The zodiac is divided into twelve portions, called ſigns, and thoſe diviſions or ſigns are denominated from the conſtellations which anciently poſſeſſed each part; but the zodiac being immoveable, and the ſtars having a motion from weſt to eaſt, thoſe conſtellations no longer correſpond to their proper ſigns, whence ariſes what we call the preceſſion of the equinoxes.

When a ſtar therefore is ſaid to be in ſuch a ſign of the zodiac, it is not to be underſtood of that ſign or conſtellation of the firmament, but only of that twelfth part of the zodiac, or dodecatemory thereof.

Caſſini has alſo obſerved a track in the heavens, within whoſe bounds moſt of the comets, though not all of them, are obſerved to keep, which for this reaſon he calls the zodiac of the comets.

This he makes as broad as the other zodiac, and marks it with ſigns and conſtellations like that, as Antinous, Pegaſus, Andromeda, Taurus, Orion, the leſſer Dog, Hydra, the Centaur, Scorpion, and Sagittary.

ZONE, ζωνη, in geography and aſtronomy, a diviſion of the terraqueous globe, with reſpect to the different degrees of heat found in the different parts thereof.

A zone is the fifth part of the ſurface of the earth, contained between two parallels. See the article PARALLEL.

The zones are denominated torrid, frigid, and temperate.

The torrid zone is a faſcia, or band ſurrounding the terraqueous globe, and terminated by the two tropics. Its breadth is 46° 58′.

The equator, running through the middle of it, divides it into two equal parts, each containing 23° 29′. The ancients imagined the torrid zone uninhabitable. See TROPIC and TORRID.

The temperate zones are two faſciæ, or bands, environing the globe, and contained between the tropics and the polar circles: the breadth of each is 43° 2′.

The frigid zones are ſegments of the ſurface of the earth, terminated, one by the antarctic, and the other by the arctic circle; the breadth of each is 46° 58′. See the articles ARCTIC and ANTARCTIC.

ZOOLOGY, ζωολογια, the ſcience of animals. Artedi obſerves, that this makes one of the three kingdoms, as they are called, of natural hiſtory; the vegetable and the mineral being the two others: in theſe, however, there is this difference made by writers, that while vegetables and minerals are treated of together, as all of a piece in each, the ſubjects of zoology are divided; and it is made to compoſe, as it were, ſeveral kindoms.

Whoever is to write on plants or minerals, calls his work a treatiſe of botany or mineralogy; and we have no words to expreſs any ſubdiviſion of them into kindoms: but, in zoology, we treat, as different ſubjects, the different parts of it; and the hiſtory of birds is ſeparated, by ſome, from the reſt, under the name of ornithology; that of quadrupeds, under the name of tetrapodology; and we have for the reſt, the words entomology, amphibiology, and the like, expreſſing theſe things which are properly but the parts of zoology, as ſo many diſtinct and ſeparate ſtudies. See the articles BOTANY, MINERALOGY, &c.

ZOOPHORIC, or ZOOPHORIC COLUMN, is a ſtatuary column, or a column that bears and ſupports the figure of an animal. See COLUMN.

ZOOPHORUS, or ZOPHORUS, in the ancient architecture, the ſame with frieze in the modern. See the article FRIEZE.

ZOOPHYTON, or ZOOPHITE, in natural hiſtory, a kind of intermediate body, partaking both of the nature of a ſenſitive and a vegetable. See the article SENSITIVE *Plant*.

ZOOTOMY, the art of diſſecting animals, or living creatures, being the ſame with anatomy, or rather

rather comparative anatomy. See the articles DISSECTION and ANATOMY.

ZOPISSA, naval pitch, a kind of mixture of pitch and tar, ſcraped off ſhips that have been a long time at ſea.

This matter, by being gradually penetrated by the ſalt of the ſea, becomes partaker of its qualities, and being applied to the body externally, is found to be reſolutive and deſiccative.

ZOSTERA, in botany, a genus of plants, whoſe flower hath no corolla; the cup conſiſts of a plane linear ſpadix, and contains a great number of very ſhort filaments, topped with ovato-oblong antheræ; the pericarpium is membranaceous, and contains an ovate ſeed.

ZUINGLIANS, a branch of the ancient Chriſtian Reformers, or proteſtants, ſo called from their author Huldric Zuinglius, a divine of Switzerland; who, ſoon after Luther had declared againſt the church of Rome, and being then miniſter of the church at Zurich, fell in with him, and preached openly againſt indulgences, the maſs, the celibacy of the clergy, &c.

What he differed from Luther in, concerned the euchariſt: for interpreting *hoc eſt corpus meum*, by *hoc ſignificat corpus meum*, he maintained, that the bread and wine were only ſignifications of the body and blood of Jeſus Chriſt; whereas Luther held a conſubſtantiation.

As to the matter of grace, Zuinglius ſeemed inclined to Pelagianiſm, in which he differed from Calvin.

ZYGÆNA, the ballance-fiſh, in ichthyology, a ſpecies of ſqualus, with a very broad, tranverſe, hammer-like head.

This is one of the moſt extraordinary fiſh in the world; in its form, the general ſize is five or ſix feet, but it grows to be much larger. The head is the moſt extraordinary figure of that of any fiſh; it is not oblong, and running in a line with that of the body, but is placed tranſverſely, and has the appearance of the head of a hammer faſtened to its handle, the eyes are large, and placed at the two extremities; the mouth is tranſverſe, cut on the lower part of the head, and furniſhed with three or four rows of ſharp teeth; the noſtrils are ſmall, and not very conſpicuous, and the foramina at the eyes are oblong and large; the body is oblong and moderately thick; there are two back fins, and a pinna ani; the apertures of the gills are ten oblong ſlits, five on each ſide, running from juſt below the head towards the roots of the pectoral fins; the tail is divided into two parts, and the upper of theſe is much longer than the under. See plate XCVI. fig. 5.

ZYGOMA, in anatomy, a bone of the head, otherwiſe called os jugale, being no ſingle bone, but an union or aſſemblage of two proceſſes, or eminences of bones; the one from the os temporis, the other from the os malæ; theſe proceſſes are hence termed the zygomatic proceſſes, and the ſuture that joins them together, is denominated the zygomatic ſuture.

ZYGOMATICUS, in anatomy, a muſcle of the head, ariſing from the os zygoma, whence its name, and terminating at the angle of the lips. This muſcle, though uſually ſingle, is ſometimes double throughout; at other times it has a double head; ſometimes its tail only is bifid, and it is variouſly interwoven with the adjoining ones. See the preceding article.

ZYGOPHYLLUM, bean-capers, in botany, a genus of plants, the corolla whereof is compoſed of five petals, broadeſt at the top, obtuſe, emarginated, and larger than the cup; the nectarium conſiſts of ten convergent leaves, and includes the germen: the fruit is an oval pentagonal capſule, formed of five valves, containing five cells, with ſepta adhering to the valves: the ſeeds are numerous, roundiſh, and compreſſed: the figure of the fruit is ſubject to variation, and there is a ſpecies in which the parts of fructification are a fifth leſs. This genus comprehends the fabago of Tournefort. See the article FABAGO.

FINIS.

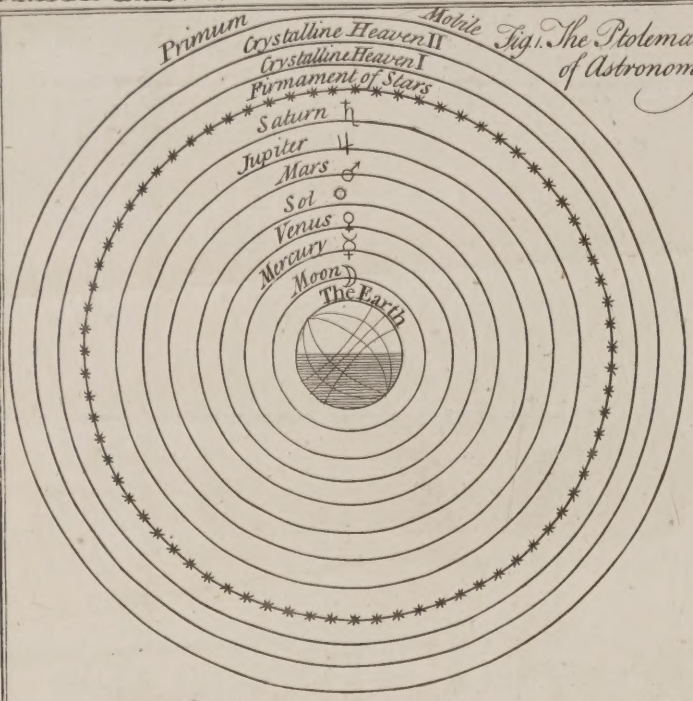


Fig. 1. The Ptolemaic System of Astronomy.

Pullies.

Fig. 2.

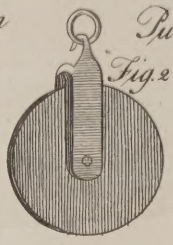


Fig. 3.

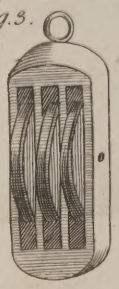


Fig. 4.

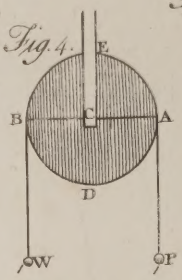


Fig. 5.

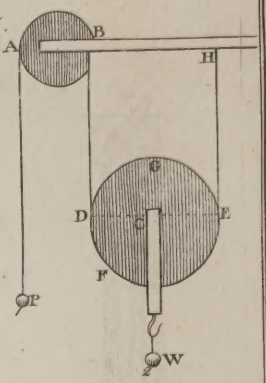


Fig. 6. Construction of Pullies.

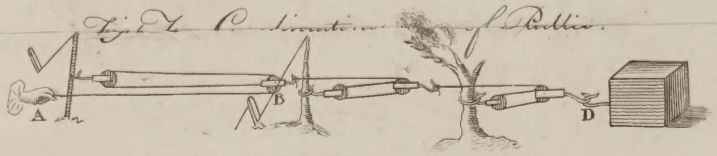


Fig. 7.

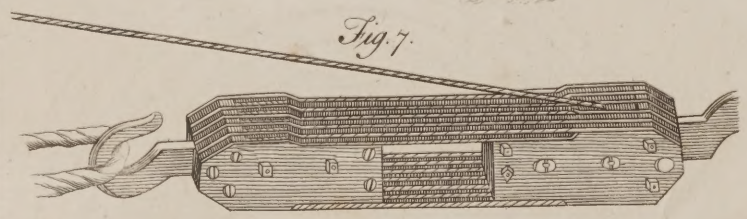


Fig. 12.

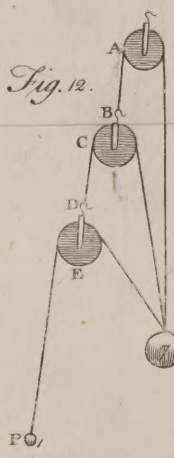


Fig. 9.

Fig. 13. Gunter's Quadrant.

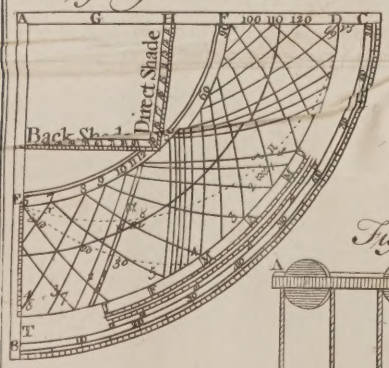
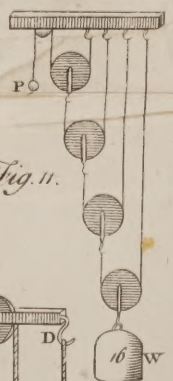


Fig. 11.



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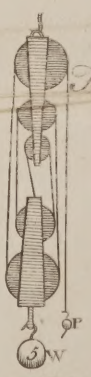


Fig. 10.

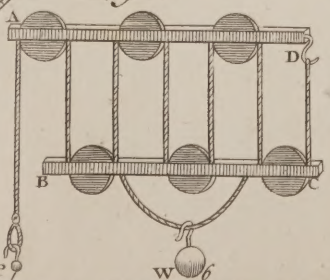
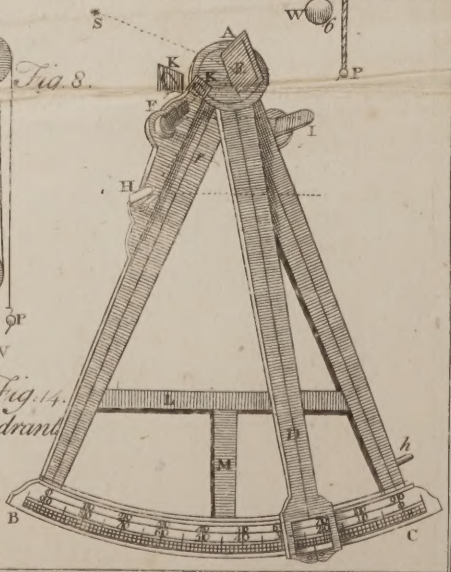


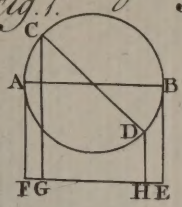
Fig. 14. Hadley's Quadrant.



Stereographic Projection of the Sphere.

Projection.

Fig. 1.



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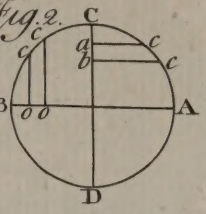
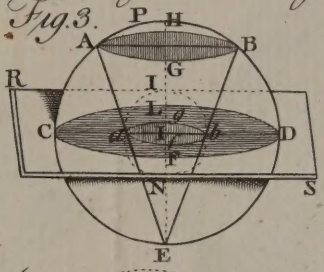


Fig. 3.



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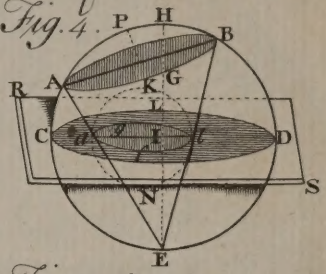


Fig. 5.

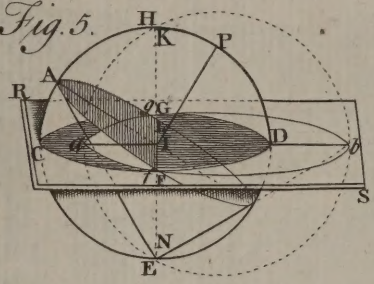
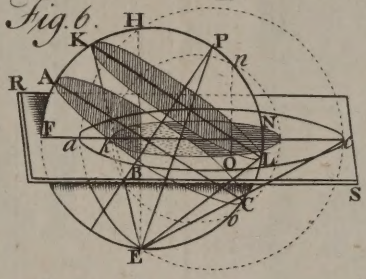


Fig. 6.



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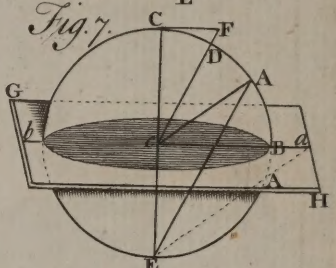

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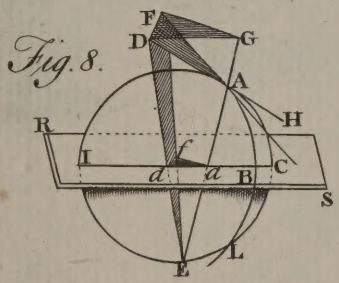

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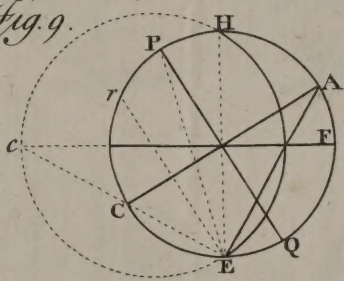
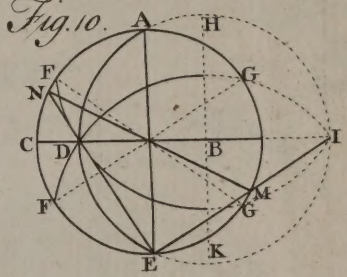


Fig. 10.



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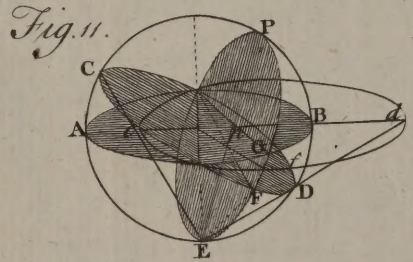

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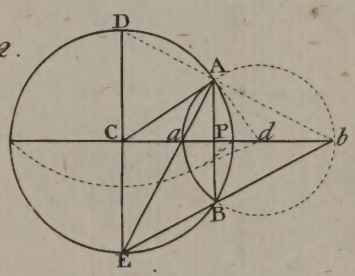


Protractor.

Fig. 13.

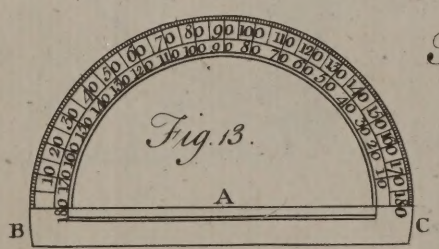
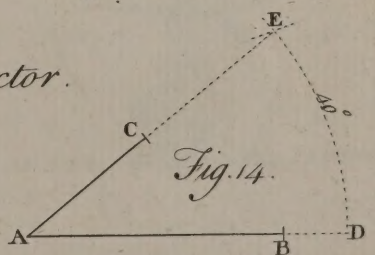


Fig. 14.



J. Lodge sculp.

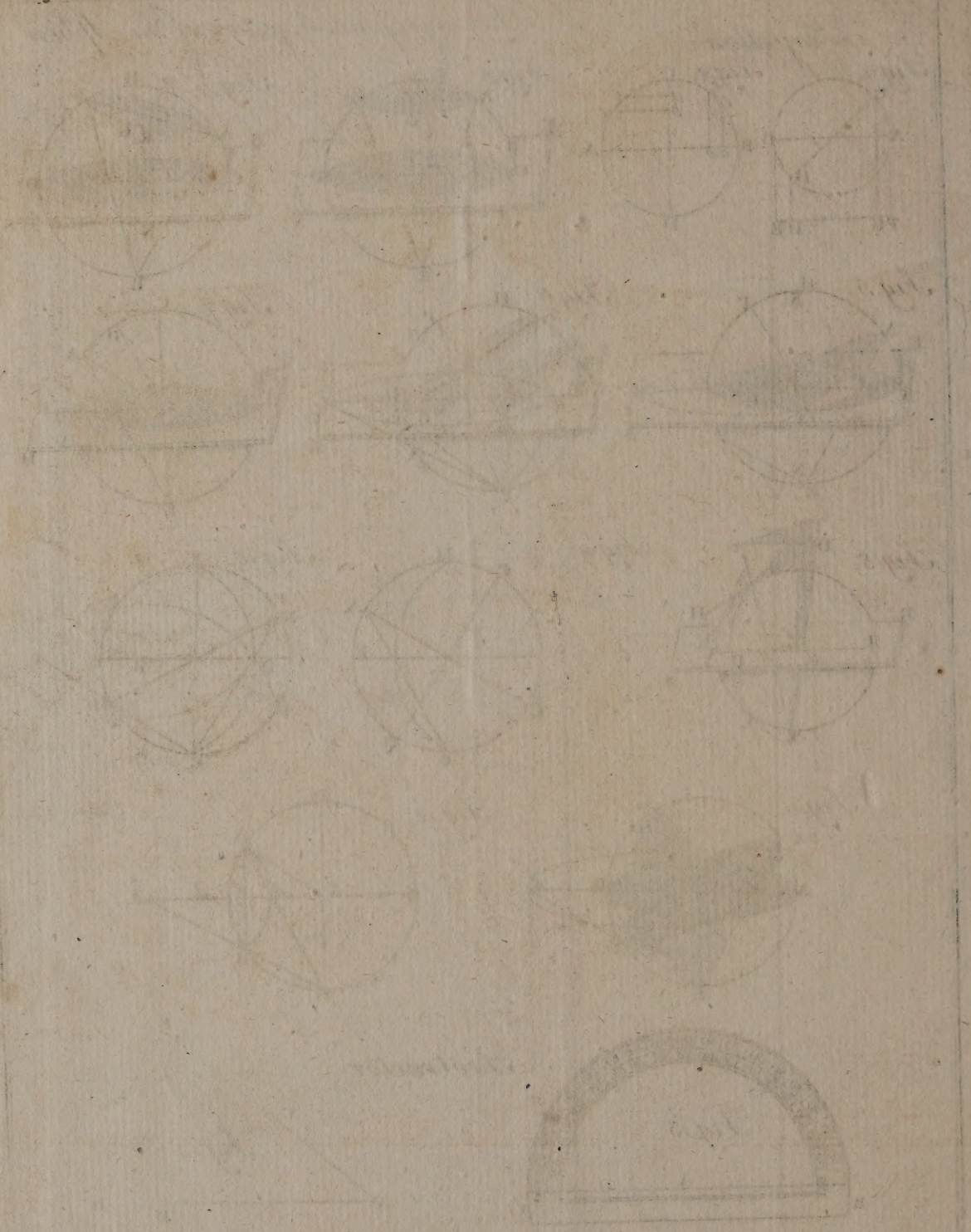


PLATE LIX.

Facing Globe.

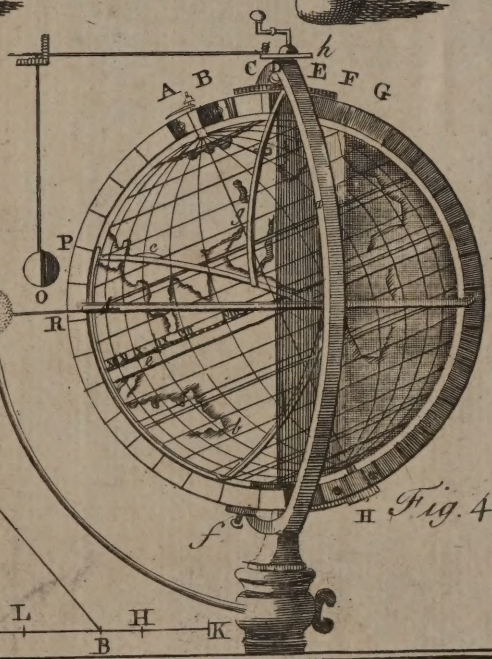


Fig. 4.

Fig. 5.

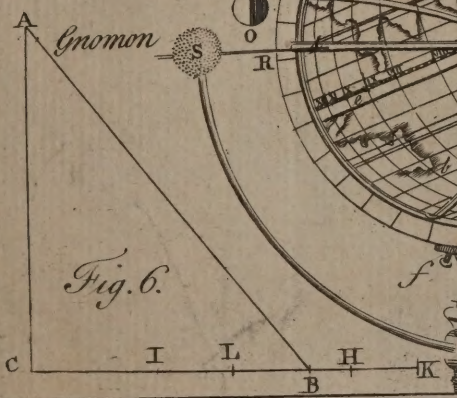


Fig. 6.

The *PATENT* GLOBES

PLATE LVIII.

Facing Glaſs.

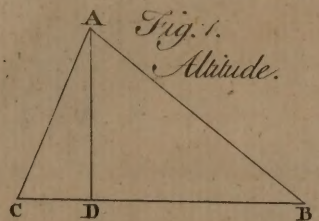


Fig. 1. Altitude.

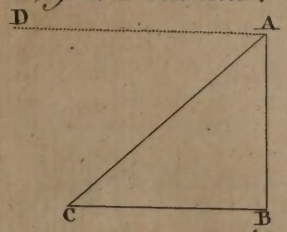


Fig. 2. Altitude.

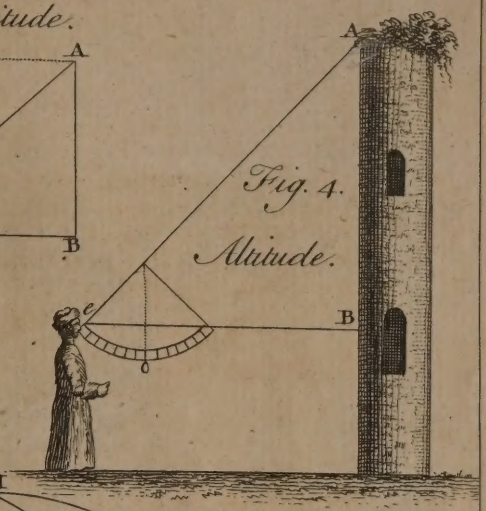


Fig. 4. Altitude.

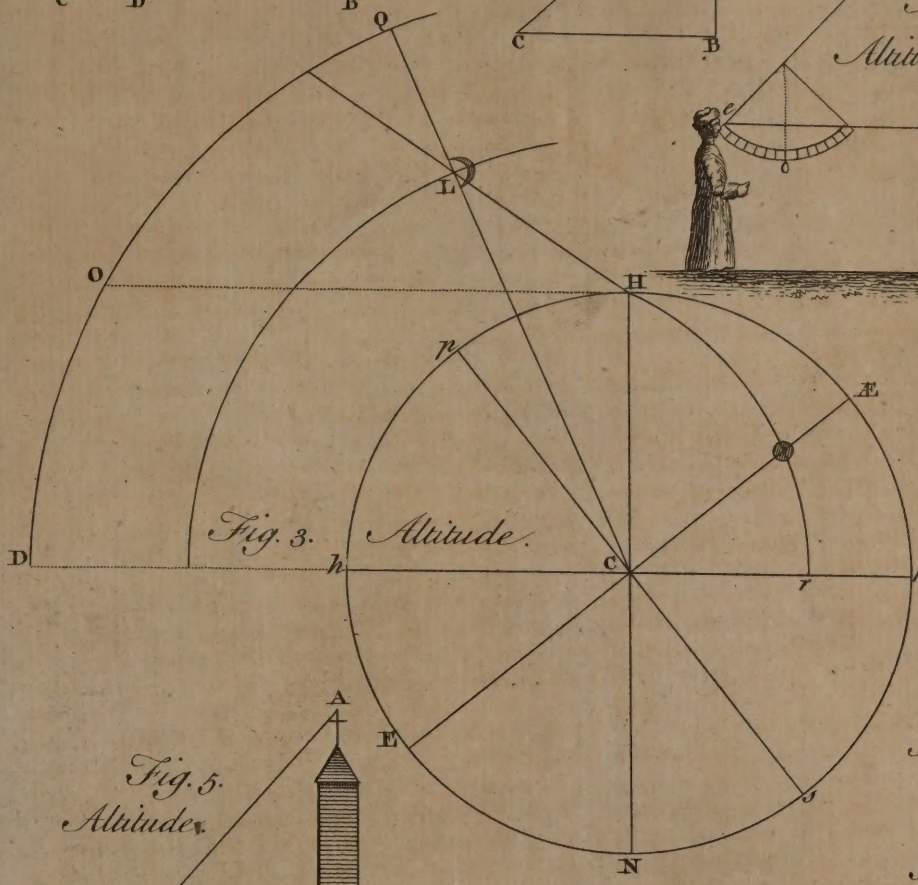


Fig. 3. Altitude.

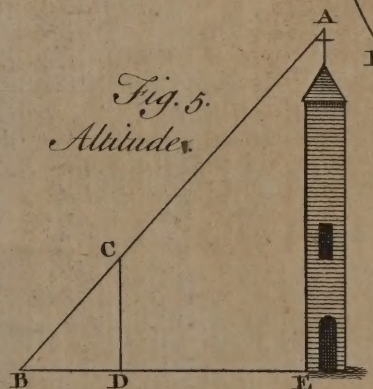


Fig. 5. Altitude.

Fig. 8. Anamorphosis.

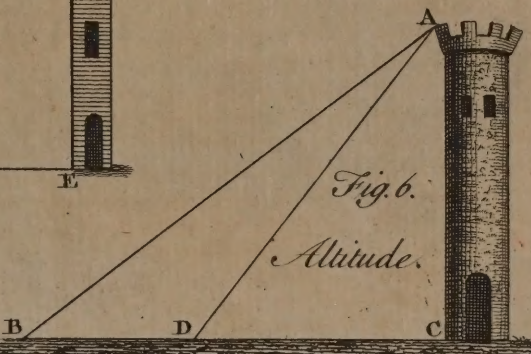


Fig. 6. Altitude.

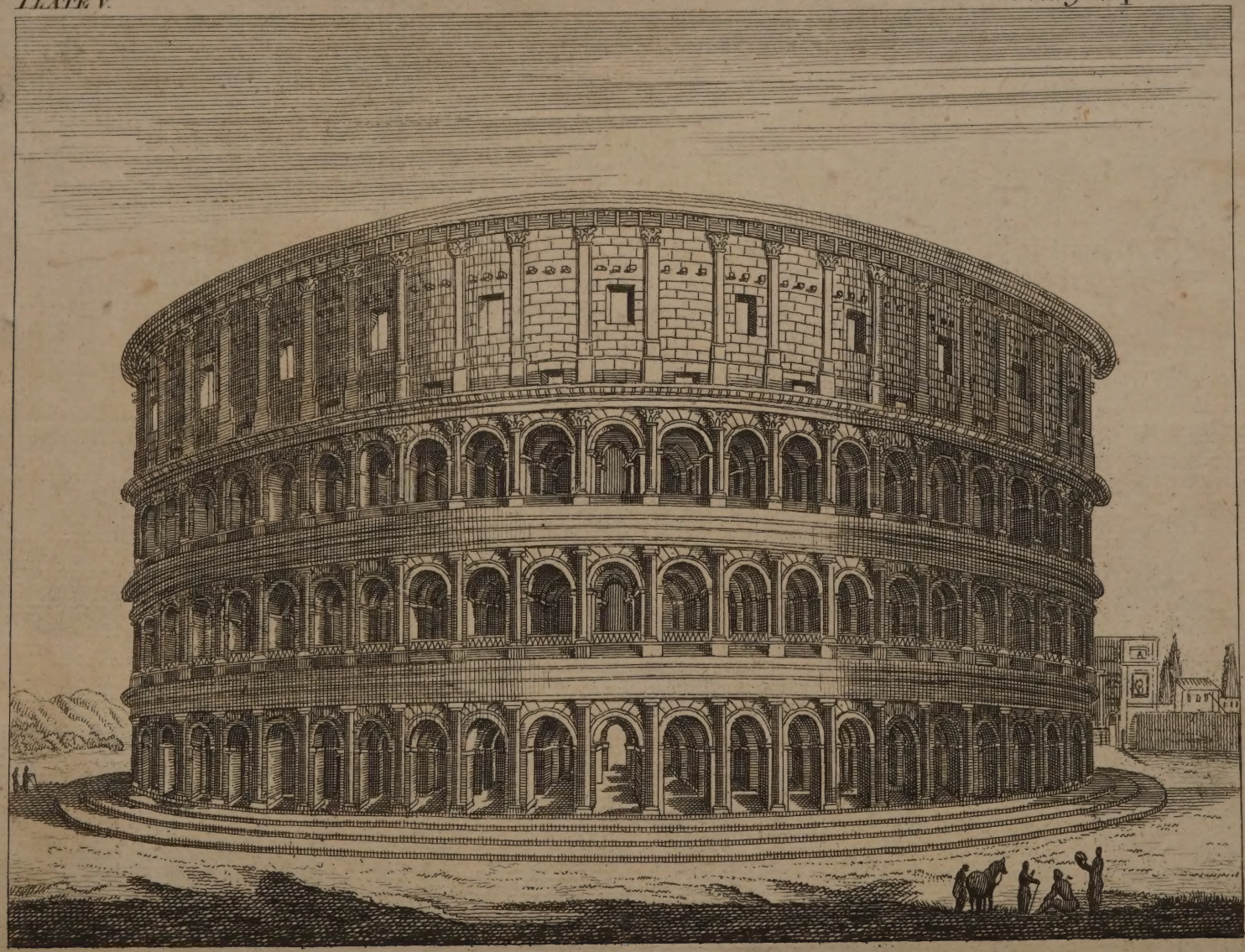



Fig. 7. Anamorphosis.